

FABIO CASSOLA (*) & ROBERT D. WARD (**)

SYSTEMATICS AND ZOOGEOGRAPHY OF THE PHILIPPINE SPECIES OF THE GENUS *THOPEUTICA* CHAUDOIR, 1861

(COLEOPTERA, CICINDELIDAE)

Chainsaws and bulldozers work faster than systematists

[R.R. VOSS & L.H. EMMONS, 1996]

INTRODUCTION

Both authors independently began work on the enigmatic genus *Thopeutica*, the senior author (FC) with species of this genus from the Indonesian island of Sulawesi (=Celebes) and the junior author (RDW) with the species from the Philippine Islands. CASSOLA (1991) published his findings as part of a more inclusive paper on the several genera of Cicindelidae found on Sulawesi. At this time it was decided to combine efforts in regards to the *Thopeutica* species of the Philippines.

Thopeutica has potential significance for studies of evolution, zoogeography and plate tectonics. The wide dispersal and diversity of the species of this genus among the various Philippine Islands, as well as its Philippine-Sulawesi distribution, place *Thopeutica* in a unique and valuable place in studies relating to the evolution of island faunas. Several of its species are almost restricted to single volcanoes (e.g., Mt. Maquiling), which may enable the dating of evolutionary change. Perhaps more importantly, the geographical distribution of *Thopeutica*, which straddles tectonically active zones at several geological plate boundaries, can shed light on the evolution and zoogeography of the Cicindelidae and other taxa indigenous to "Wallacea". However,

(*) Via Fulvio Tomassucci 12/20, I-00144 Roma, Italy (Studies of Tiger Beetles. CXXIV). E-mail: fabiocassola@skynet.it

(**) 243 Marion Creekmore Drive, Bolivar, Tennessee 38008, U.S.A.
E-mail: rdward@aeneas.net

this genus is apparently quite vulnerable to the deforestation practices devastating the Philippine landscape. In the near future, its diversity and distribution may be significantly reduced rendering it far less significant for scientific investigation.

The present overall knowledge of the tiger beetle fauna of the Philippines has been summarized by CASSOLA & WARD (1996), and more recently by CASSOLA & PEARSON (2000). These summaries indicate that a total of 130 tiger beetle species presently are known to occur in the archipelago, of which 111 (85.4%) are Philippine endemics. This points out that the Philippine tiger beetle fauna is at least the fifth richest country in the world in terms of the absolute number of tiger beetle species ($\text{km}^2/\text{species}$ ratio: 2,294) and fourth highest in absolute number (and percentage) of endemic species.

Unfortunately, since most islands and areas have virtually no forests left, a rich unknown biological heritage is probably gone for ever. Most faunal elements (including several tiger beetle species) were certainly linked to forest environment, and only a few could probably adapt themselves to secondary forest or to non-forested habitats. The Wallacean endemic genus *Thopectica* Chaudoir (in Schaum, 1861) is probably one of these.

THE COUNTRY

The Philippine Archipelago (fig. 1) includes over 7000 islands, with only eleven greater than 2500 km^2 . The two largest, Luzon and Mindanao, account for 68% of the total land surface. Nearly all islands have rugged uplands in the interior, usually rising to between 1300 and 2500 meters. The highest mountains are close to 3000m in altitude: Mt. Apo in Mindanao (2954m) and Mt. Pulog in Luzon (2930m). Additional information about the islands' tectonics, geography, and biogeography is available in AUDLEY-CHARLES (1987), VANE-WRIGHT (1990), DE JONG & TREADAWAY (1993), RAMMLMAIR (1993), HALL & BLUNDELL (1996), HÄMÄLÄINEN & MÜLLER (1997).

Originally, the pre-European Philippine archipelago was clothed wholly in forest: lowland and montane monsoon forests on the western side, lowland and montane rain forest on the eastern side. However, the Philippines has become one of the most densely populated countries in Southeast Asia, with nearly 65 million people in 1989 and a population growth rate of nearly 2 per cent annually. As a consequence, the

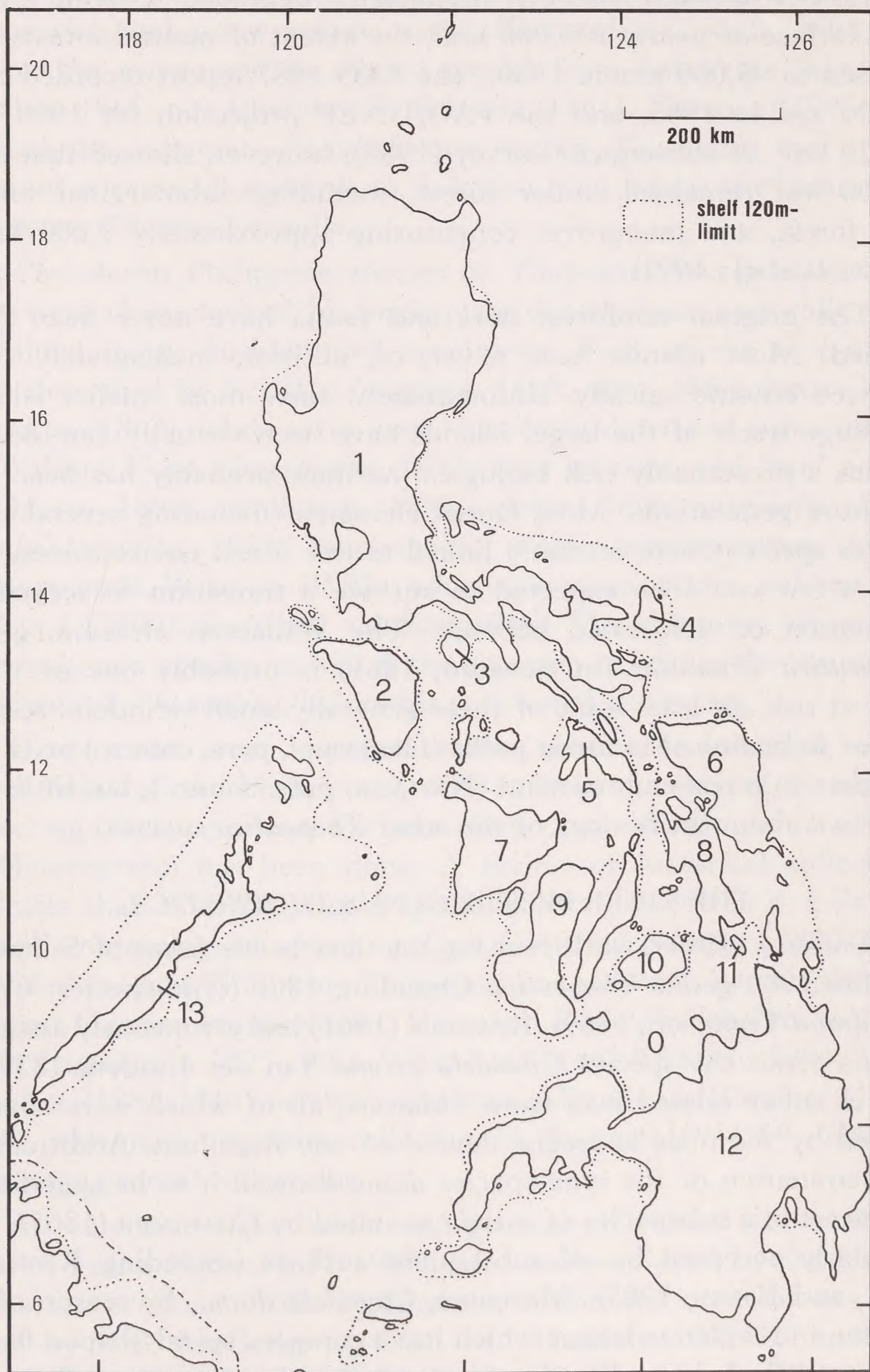


Fig. 1 - Map of the Philippine Islands: 1. Luzon; 2. Mindoro; 3. Marinduque; 4. Catanduanes; 5. Masbate; 6. Samar; 7. Panay; 8. Leyte; 9. Negros; 10. Bohol; 11. Panaon; 12. Mindanao; 13. Palawan.

natural environment has been significantly degraded. Despite a total land surface of nearly 300,000 km², the extent of natural forests was reduced to 95,000 km² in 1980. The FAO 1987 report recorded only 74,300 km² in 1985, and the FAO/UNEP projection for 1990 was 67,420 km². A subsequent survey (1988), however, showed that only 64,400 km² remained under forest (including submarginal forest, pine forest, and mangroves constituting approximately 9,000 km²) (COLLINS *et al.*, 1991).

The original rainforest flora and fauna have never been fully studied. Most islands have never, or, at best, inadequately been explored entomologically. Unfortunately, since most smaller islands and huge tracts of the larger islands have been virtually denuded of forests, a presumably rich biological heritage probably has been lost to future generations. Most faunal elements (including several tiger beetles species) were certainly linked to this forest environment, and only a few could be expected to survive a transition to secondary forestation or deforested habitats. The Wallacean endemic genus *Thopeutica* Chaudoir (in Schaum, 1861) is probably one of those most at risk. At least some of these generally small cicindelid species appear to be linked to forest paths (OESTERLE, pers. comm.) or to wet boulders in forest environment (NAVIAUX, pers. comm.), but little else is known about the ecology of the other *Thopeutica* species.

THE TIGER BEETLE GENUS *THOPEUTICA*

CASSOLA (1991), while revising the tiger beetle fauna of Sulawesi, redefined the genus *Thopeutica* Chaudoir, 1861 (type-species: *Cicindela diana* Thomson, 1859). RIVALIER (1961) had erroneously assigned to this genus the species *Cicindela eximia* Van der Linden, 1829, as well as other related taxa from Sulawesi, all of which were characterized by the male aedeagus devoid of any flagellum. Additionally, re-examination of the type species *diana* showed it to be specifically distinct, not a subspecies of *eximia* as stated by CHAUDOIR (1865), and popularly accepted by all subsequent authors (including RIVALIER, 1961, and KIBBY, 1985). Moreover, *Cicindela diana*, by reason of its shorter and wider aedeagus which has a complex spiral-shaped flagellum, actually belonged to the sister genus (other than that of *eximia*) that RIVALIER (1961, 1971) had called *Diotophora* (type species: *virginea* Schaum, 1861, Philippine Islands). Since *diana* was regarded as the type-species of the genus *Thopeutica*, as originally designated by

CHAUDOIR (in SCHAUM, 1861), *Diotophora* became a junior synonym of *Thopeutica*, and a new generic name, *Wallacedela* Cassola, 1991, was created for *eximia* and its related species from Sulawesi (*Thopeutica* Rivalier, 1961, nec Chaudoir in Schaum, 1861). CASSOLA (1991) also created the subgenus *Pseudotherates* within *Thopeutica* for several aberrant species, all endemic to Sulawesi, that mimic the semi-arbo-real genus *Therates* Latreille.

The eleven Philippine species of *Thopeutica* recognized at this time were characterized by inadequate descriptions, and collections contained many misidentified specimens. Four of the eleven had been described by SCHAUM (*virginea*, 1860; *clara*, 1860; *fugax*, 1862; *conspicua*, 1862), while seven more had been described subsequently by Walther HORN (*interposita*, 1892, with its supposed 'var.' *pauper* W. Horn, 1896; *simulatrix*, 1896; *suavis*, 1896; *virginalis*, 1901; *pseudointerposita*, 1924; *microcephala*, 1924; *angulihumerosa*, 1929). More recently, WIESNER (1992a) added one more species, *milanae*, and CASSOLA (2000) described *rolandmuelleri*. The discovery of several obviously new species, as well as the necessity to resolve the taxonomic problems of *Thopeutica*, led to this revision of the genus.

Despite the great importance that should be attached to the insect fauna of the Philippines, very little in the way of systematic collecting (except perhaps for butterflies, dragonflies, or some groups of Heteroptera) has been done. A review of historical collections indicates that most *Thopeutica* specimens were collected as a part of general entomological sampling. Carl Gottfried Semper (1832-1893) provided the first Philippine *Thopeutica* to specialists, namely the pre-eminent German entomologist, Hermann Rudolph Schaum, in 1865. Léon Laglaize in 1875, John Whitehead (1861-1899) in 1894, Willy Schultze (1881-1940) in 1907, and especially Georg Böttcher (1890-1920), who made intensive collecting in the years 1914-19, followed with large general collections.

An extensive tiger beetle and general collection was made by Charles Fuller Baker (1872-1927), who was employed by the United States Government in the Philippines. Additional material was provided by R.C. McGregor (1926), F.C. Hadden (1931-32) and J.O. Perry (1932), as well as by Philip Jackson Darlington, Jr. (1904-1983) in 1945 (see HORN & KAHLE 1935-37; HORN *et al.* 1990). Finally, a number of the specimens studied were collected by J. Glaser (1978), J. Margraf (1982) and R.A. Müller (1996), by Japanese collectors such

as T. Okadome (1970), M. Sato (1970) and K. Kawano (1994, 1996), and by Philippine collectors and students including Fr. E. Schoenig (1966), H.M. Torrevillas (1966-67), Lorna Tuanggang (1977), A. Concepcion (1978), R. Lumawig (1987), S.L. Cabigas (2002) and A.M. Almeroda (1988). However, the only modern tiger beetle specialists who specifically collected Cicindelidae in the Philippines were Roger Naviaux (June 1989) and Andreas Oesterle (December 2001). Finally, a research project on Leyte Island (1991) carried out by Jürgen Trautner and W. Schawaller, resulted in a small collection of 12 tiger beetle species, including two *Thopeutica* (TRAUTNER & SCHAWALLER, 1996).

MATERIALS AND METHODS

As far as possible, holotype and/or paratype specimens as well as historically significant specimens have been examined for all species. Moreover, specimens deposited in numerous collections and institutions from all over the world were borrowed and examined in the course of this study. These have been given pale-blue identification labels. Type specimens have been given red identification labels. A total of 1,085 adult specimens form the basis for the present study, a surprisingly small number which makes it clear that further specialized field work is still needed for most Philippine islands and island groups. Collection localities have been identified using PETERS (1994) and the Nelles Verlag Map (1: 1,500,000) of the Philippines.

A first account of the early results of this study was presented by the first author (FC) to the International Workshop on "Aspects of Natural History of the Philippines", which was held in the Museum für Naturkunde of Berlin, Germany, on December 7-8, 1998 (MEY, 1999).

Contributing institutions and collections are listed below with acronyms used in the text.

AMNH	American Museum of Natural History, New York, USA (Dr. L.H. Herman, Jr.)
ANSP	Academy of Natural Sciences, Philadelphia, Pennsylvania, USA
BMNH	The Natural History Museum, London, U.K. (Mr. M.J.D. Brendell)
BPBM	Bishop Museum, Honolulu, Hawaii, USA (Mr. G.A. Samuelson)

CMNH	Carnegie Museum of Natural History, Pittsburg, Pennsylvania, USA (Mr. R.L. Davidson)
DEI	Deutsche Entomologische Institut, Eberswalde, Germany (Dr. L. Zerche)
FMNH	Field Museum of Natural History, Chicago, Illinois, USA (Mr P.P. Parrillo)
IRSNB	Instifut Royal des Sciences Naturelles de Belgique, Bruxelles, Belgium (Mr. A. Drumont)
ITZ	Instituut voor Taxonomische Zoölogie, Amsterdam, The Netherlands (Mr. B. Brugge)
MCZ	Museum of Comparative Zoology, Harvard, Massachusetts, USA (Dr. A. Newton)
MCZR	Museo Civico di Zoologia, Roma, Italy (Dr. A. Zilli)
MSNG	Museo Civico di Storia Naturale "G. Doria", Genova, Italy (Dr. R. Poggi)
MSUC	Michigan State University, East Lansing, Michigan, USA (Dr. R.L. Fischer)
MZLU	Museum of Zoology, Lund University, Sweden (Mr. R. Danielsson)
NHMW	Naturhistoriches Museum Wien, Vienna, Austria (Dr. H. Zettel)
RMNH	Nationaal Natuurhistorisch Museum, Leiden, The Netherlands (Dr. R. de Jong)
SMNS	State Museum of Natural History, Stuttgart, Germany
UMIC	University of Michigan, Ann Harbor, Michigan, USA
UPLB	Museum of Natural History, University of the Philippines, Los Baños, Luzon, The Philippines
USNM	United States National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA (Dr. T.L. Erwin)
ViSCA	Visayas State College of Agriculture, Bay Bay, Leyte, The Philippines (Mrs. L.T. Villacarlos, Dr. Maria J.C. Ceniza)
ZMB	Museum für Naturkunde der Humboldt-Univ., Berlin, Germany (Dr. F. Hieke, Dr. M. Uhlig)
ABC	Arnaldo Bordoni, Firenze, Italy
AOC	Andreas Oesterle, Leutenbach, Germany

FCC	Fabio Cassola, Roma, Italy
HAC	Hideo Akiyama, Yokohama, Japan
HSC	Hirofumi Sawada, Aomori, Japan
HZC	Herbert Zettel, Vienna, Austria
JHRC	John H. Robinson Collection (presently in R.R. Murray's collection, College Station, Texas, USA: ROBINSON & MURRAY, 1980)
JMC	Jirí Moravec, Adamov u Brna, Czech Republic
JWC	Jürgen Wiesner, Wolfsburg, Germany
KWC	Karl Werner, Peiting, Germany
MHC	Michio Hori, Kyoto, Japan
PSC	Peter Schüle, Düsseldorf, Germany
RDWC	Robert D. Ward, Bolivar, Tennessee, USA
RNC	Roger Naviiaux, Domérat, France
SCC	Stanley L. Cabigas, Cagayan de Oro City, Mindanao, Philippines
ZVC	Herbert & S.V. Zettel, Vienna, Austria

SYSTEMATICS

Genus **THOPEUTICA** Chaudoir, 1861 (= *Diotophora* Rivalier, 1961)

[Type species: *Cicindela diana* Thomson, 1859 (Sulawesi)]

Description. Small to medium-sized tiger beetles, with large protruding eyes and frequently reduced body pubescence. Head capsule glabrous except for paired sensory setae at fixed loci. Surface sculpture of head and pronotum fine to very fine, sometimes smooth. Clypeus without pair of setigerous punctures. Antennal plates smooth or polished in appearance; antennae filiform, slender, elongate. Labrum short, transverse, much wider than long, basically tridentate (often lateral teeth are more or less effaced), usually metallic in colour, with eight to twelve submarginal and discal setae (to multisetose).

Elytra usually dull black, contrasting with metallic head and pronotum; surface (of most species) with fine microsculpture throughout, and with shallow, evenly spaced green to bronze punctures, which are slightly deeper basally. Elytral maculation pattern of *Cicindela* type, typically fragmented into six dots, consisting of humeral dot,

sub-humeral dot, middle band with mesal dot, subapical and apical dots. The middle band is reduced to merely two dots in most species. Females of many Philippine species possess a mesally positioned glossy "mirror" spot and have the mesepimeron modified into a glossy black, mostly glabrous mating structure with a posterior depression encompassing a deep coupling sulcus with a pit beneath the elytral humeral angle.

Venter variably pubescent to glabrous. Pro- and mesocoxae, lateral margins of metacoxae, mesepimera, mesepisterna, and visible sterna 3-5, usually clothed, partially at least, with thickened, white recumbent setae (of variable density). Pro- and mesotrochanters each with a single subapical sensory seta. Femora with curved white setae along the ventral margin.

Aedeagus variable in shape, usually bulky, medially globose, feebly arc-shaped. Inner sac with a complexly enrolled flagellum, describing several ear-like convolutions, two of which are conspicuously overlapping on the right side; arciform sclerite longitudinal, nearly straight.

Fifty-eight (possibly fifty-nine) species known from Sulawesi and the Philippines.

SYNOPSIS OF SUBGENERA:

A) Subgenus **Thopeutica** Chaudoir, 1861 (s. str.)

Species small to medium-sized, sometimes larger; slender, with long legs. Labrum transverse, three to four times as wide as long, multi-setose. Females of many (Philippine) species exhibit a pair of glossy black mirrored spots on the elytra. Coupling sulcus variable, usually lacking in larger species (from Sulawesi), consisting of a deep and conspicuous pit in most Philippine species. Thirty-five (thirty-six?) species, from Sulawesi and the Philippines.

We have arranged these species into six stems within three definable species groups.

- a) SPECIES-GROUP *DIANA*: medium to large-sized species; antennomere 5 subequal to or slightly longer than 4; females devoid or nearly devoid of coupling sulci. 9-10 species, Sulawesi.

Stem 1. Aedeagus short, with blunt apex (5-6 species, Sulawesi: *diana* Thomson, 1859; *sawadai* Cassola, 1991; *bugis* Cassola, 1991; *ashidai* Cassola, 1997; *sphaericollis* W. Horn, 1931; *allardiana* Cassola, 1991?).

Stem 2. Aedeagus elongate, narrow, with acute or button-ended apex (4 species, Sulawesi: *eustalacta* Schaum, 1861; *werneriana* Cassola, 1991; *vantoli* Cassola, 1991; *toraja* Cassola, 1991).

b) SPECIES-GROUP *STENODERA*: small to medium-sized species; antennomere 5 longer than 4; females with mirror spot variously present or absent, generally consistent within a species; distinct to deep coupling sulci. 4 species, Sulawesi; 19-20 species, Philippines (one species, *davaoensis*, lacks a male example to confirm our placement here).

Stem 3. Aedeagus tapering, short (4 species, Sulawesi: *stenodera* Schaum, 1861; *waltheri* Heller, 1897; *aurothoracica* W. Horn, 1897; *whitteni* Cassola, 1991; 11-12 species, Philippines: *microcephala* W. Horn, 1924; *milanae* Wiesner, 1992; *angulihumerosa* W. Horn, 1929; *rolandmuelleri* Cassola, 2000; *suavis* W. Horn, 1896; *virginea* Schaum, 1860; *darlingtonia* nov., *boettcheri* nov., *luzona* nov., *pseudoluzona* nov., *negrosicola* nov., *davaoensis* nov.?).

Stem 4. Shaft of aedeagus slender, narrow and elongate (3 species, Philippines: *fugax* Schaum, 1862; *virginalis* W. Horn, 1901; *pseudointerposita* W. Horn, 1924).

Stem 5. Shaft of aedeagus much inflated after base, with long acuminate apex (5 species, Philippines: *interposita* W. Horn, 1892; *pauper* W. Horn, 1896; *zetteli* nov.; *simulatrix* W. Horn, 1896; *palawanensis* nov.).

c) SPECIES-GROUP *CONSPICUA*: large dark colored species; antennomere 4 subequal to or greater than 5; females with large, glossy mirror spot on each elytron, mesepisterna with deep coupling sulci; males with aedeagus large, much inflated after base, strongly hooked at apex. 2 species, Philippines.

Stem 6. Aedeagus hooked apically (2 species, Philippines: *conspicua* Schaum, 1862; *perconspicua* nov.)

B) Subgenus **Philippiniella** nov.

[Type species: *Cicindela clara* Schaum, 1860]

Small species of compact form, legs relatively short; body mostly metallic coloured. Antennae with antennomere 4 subequal to 5. Labrum transverse, two and one-half to three times as wide as long. Elytra of females devoid of glossy mirror spot (occasionally specimens

will have a few shiny metallic bumps where mirror spot would be); middle lunule represented by marginal and discal dots transversely aligned or coalesced into a transverse band; subapical dot transversely oriented. Pro- and mesotarsi without dorsal grooves. Coupling sulcus consisting of a deep fovea in the middle of mesepisterna, below the level of elytral epipleura. Aedeagus fusiform, short, squat, with a short blunt apex. Four species, Philippines (Luzon Island): *clara* Schaum, 1860; *aenula* W. Horn, 1905; *suavissima* Schaum, 1862; *rugothoracica* W. Horn, 1907.

C) Subgenus **Pseudotherates** Cassola, 1991

[Type species: *Cicindela guttula* Fabricius, 1801]

Species strongly mimicking *Therates* in appearance, may also mimic species of this genus in behaviour. Labrum testaceous, sometimes feebly tinged with a greenish metallic hue. Antennae with antennomere 5 subequal to or slightly longer than 4. Elytra metallic violaceous-black, usually with rufescent clearly outlined maculae; females without any mirror spot, coupling sulcus very small or lacking. Aedeagus short, tapering, with a more or less blunt apex. Nineteen species, Sulawesi: *guttula* Fabricius, 1801; *flavilabris* W. Horn, 1914; *viridimetallica* W. Horn, 1934; *paluensis* Cassola, 1991; *pseudopaluensis* Sawada & Wiesner, 1994; *alexanderriedeli* Werner & Wiesner, 1997; *major* Cassola, 1991; *muna* Cassola, 1997; *punctipennis* Jordan, 1894; *parva* Cassola, 1991; *gerstmeieri* Werner & Wiesner, 1997; *luzuk* Cassola, 1991; *apiceflava* Cassola, 1991; *djufrana* Matalin, 1998; *albapicalis* W. Horn, 1892; *beccarii* Cassola, 1991; *hiro* Cassola, 1991; *afonini* Matalin, 1998; *theratoides* Schaum, 1861). WIESNER (1980) listed *theratoides* in the Philippine fauna too, most probably incorrectly.

SYNOPSIS OF THE PHILIPPINE SPECIES

Subgenus **Thopeutica** s. str.

SPECIES GROUP *STENODERA*

STEM 3

Moderately small beetles ranging in length from 7.3-11.5 mm (without labrum) although most species are in the 8.0-9.7 mm range.

Mandibles generally elongate, often with all pre-apical incisors showing beyond the labrum. Basal half (to or beyond 3rd pre-apical incisor) testaceous. Left mandible of most species with 3rd pre-apical incisor obtusely truncate. Antennomere 5 distinctly longer than 4.

Elytra more or less evenly granulate punctate from base to apex in most species; apex serrulate, sutural spine small to obsolete. Females of most species with well formed elytral mirror spot. Elytral maculation typically consisting of 6 separate dots.

Mesepisternum of males generally smooth and shallowly excavate, mostly metallic blue-green or green (shades) with the surface somewhat dulled by microsculpture. Here the mesepisternum and mesepimeron more or less form a smooth unit.

Females have the mesepisternum and adjacent mesepimeron largely modified into a coupling structure. The mesepisternum of the female is variously modified to include an anterior depression, dorso-mesal ridge and “coupling sulcus” posteriorly, usually near the pleural suture and containing a pit, groove or combination of the two. The surface is mostly glossy black without evident microsculpture and glabrous, except at ventral apex and occasionally along part of the pleural suture. The mesepimeron is sharply juxtaposed to the mesepisternum along the pleural suture, often at a right angle; dorsally it is wedged beneath the humeral angle of the elytron and usually is setose.

Aedeagus slender, narrow and long, apex elongate and rounded or with slight dorsal hook or knob.

KEY TO PHILIPPINE SPECIES OF STEM 3

- 1a. Prothorax mostly glabrous, setation restricted to pleuro-sternal suture or along the anterior margin 2
- 1b. Pronotum with lateral margins and/or lateral angles variably setose; propleurae and prosternum variably setose 5
- 2a. Length less than 10 mm. Head and pronotum not disproportionately small 3
- 2b. Length greater than 10.5 mm. Head and pronotum disproportionately small *davaoensis*

- 3a. Labrum with 10-14 submarginal setae. Anterior margin of propleuron setose. Females without elytral mirror spot *virginea*
- 3b. Labrum with 8 submarginal and mesal setae. Propleuron at most setose along the pleuro-sternal suture. Females with elytral mirror spot 4
- 4a. Males: aedeagus with short, straight apical beak. Females with elytral mirror spot poorly defined *microcephala*
- 4b. Males: aedeagus with short, hooked tip. Females with elytral mirror spot relatively large, well defined *milanae*
- 5a. Pronotum distinctly longer than wide, trapezoidal in female; postero-lateral angles well developed. Elytra with humeral callus 6
- 5b. Pronotum subsquare to slightly longer than wide, frequently laterally globose; postero-lateral angles small to obsolete. Elytra without humeral callus, humeral angle more or less evenly rounded 7
- 6a. Pronotum with antero- and postero-lateral corners setose. Propleuron with antero-ventral half setose. Female: mirror spot very large, irregularly oval. Length less than 10 mm *angulihumerosa*
- 6b. Pronotum with lateral margins setose. Propleuron wholly setose. Female mirror spot small, oval. Length greater than 10 mm *rolandmuelleri*
- 7a. Prosternum almost entirely setose 8
- 7b. Prosternum at most with 1-3 discal setae and fringe along pleural sternal suture 9
- 8a. Size greater than 9.2 mm. Mentum with pair of setae on median tooth *luzona*
- 8b. Size less than 9.3 mm. Mentum without setae on median tooth *pseudoluzona*
- 9a. Propleuron with setation restricted to near the antero-ventral margin. Left mandible with 3rd pre-apical incisor elongate, acute. Pronotum with anterior and posterior angles glabrous *suavis*

- 9b. Propleuron with at least antero-ventral half setose. Left mandible with 3rd pre-apical incisor more blade-like, obliquely truncate. Anterior and posterior angles setose 10
- 10a. Males 11
- 10b. Females 12
- 11a. Aedeagus with short, pointed (blunt) apex *darlingtonia*
- 11b. Aedeagus with moderately long, straight apex *boettcheri*
- 11c. Aedeagus with apex stretched into a slender, straight, slightly button-ended beak *negrosicola*
- 12a. Mesepisternum with distinct ridge between anterior depression and vertical posterior depression (coupling sulcus) and pit near the pleural suture. Elytral spine sub-acuminate to short and acute *darlingtonia*
- 12b. Mesepisternum with distinct ridge between anterior depression and dorso-ventral coupling sulcus which has a mesally situated deep vertical pit and terminates with a shallow antero-ventrally directed excavation. Elytral spine short and acute *boettcheri*
- 12c. Mesepisternum with at most slight rise between anterior shallow anterior excavation and deeply depressed coupling sulcus with deep dorso-ventrally oriented pit adjacent to the pleural suture. Elytral spine obsolete to at most short and obtuse *negrosicola*

1. *Thopeutica (Thopeutica) microcephala* (W. Horn) (fig. 2 a-c)

Cicindela microcephala W. Horn, 1924b: 87 ["Mindanao: Surigao (C.F.Baker)", 1 ♀]. W. Horn 1926: 164; 1938: pl. 48 (fig. 23). Döbler 1973: 395.

Cylindera (Thopeutica) microcephala (W. Horn). Schilder 1953: 547.

Diotophora microcephala (W. Horn). Rivalier 1961: 137. Wiesner 1980: 125.

Thopeutica (Thopeutica) microcephala (W. Horn). Cassola 1991: 521. Wiesner 1992b: 171. Lorenz, 1998: 51.

Type Specimens. *Th. microcephala* was described from a single female specimen, labeled "Surigao, Mindanao, Baker [*printed*]; Type, W. Horn [*printed*]; Holotypus [*red printed label*]", in the DEI collection (DÖBLER, 1973). One male specimen in the ZMB, collected

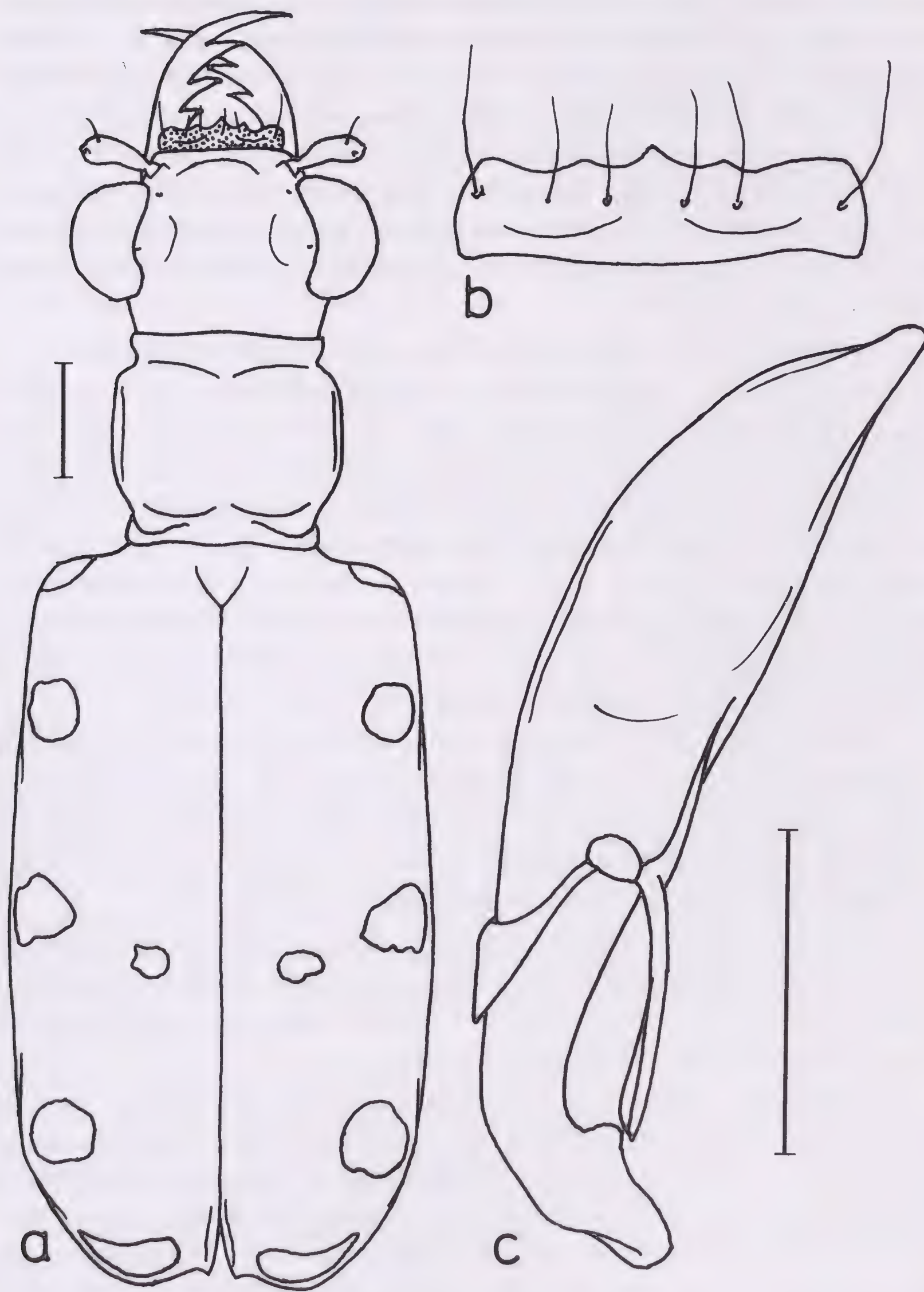


Fig. 2 - *Thopeutica (Thopeutica) microcephala* (W. Horn, 1924). Holotype ♀ (DEI): a. habitus; b. labrum; ♂ from "Philippinen, Mindanao, Surigao" (ZMB): c. aedeagus. Scale-lines: 1 mm.

later by Böttcher in the same region of Mindanao (Surigao), is considered to represent the male of the species. However, another male specimen from ZMB with the same label data differs somewhat in the body size, general facies and shape of the aedeagus apex; this specimen is provisionally assigned to *Th. milanae* Wiesner (see remarks, below). A female specimen from DEI, also labeled "Mindanao, Surigao" which is nearly identical to the *microcephala* holotype and probably belonged to Baker's original series, is not considered to be a type specimen and was probably acquired later, as W. Horn clearly designated a single female as the (holo)type.

Specimens examined. Three, including the holotype.

Diagnosis. Length: 7.4-9.2 mm (without labrum). Head and pronotum metallic dark bronze, with green to blue-green to blue-violet reflections. Pronotum subsquare, slightly wider than long, with anterior and posterior collars short and postero-lateral angles small and rounded. Elytra dull black, typically six-spotted (the discal dot smaller than other dots), with a bluish to violet metallic luster especially on shoulders, laterally, and posteriorly on disc. Venter metallic blue-green, with golden to violet reflections. Male aedeagus short, fusiform, tapering, terminating in a short straight beak.

Redescription. *Head* and eyes relatively small; dark bronze to metallic blue-green, with violet reflections on clypeus, antennal plates, around eyes and genae. Very fine concentric striae on frons and vertex; fine longitudinal striae entad of eyes, fine transverse wavy wrinkles behind eyes on neck; genae longitudinally striate.

Antennae slender, long, surpassing the basal half of the elytra in male, slightly shorter in female. Scape and antennomere 2 metallic green to blue-green, antennomeres 3-4 nearly glabrous, metallic violet, 5 clearly longer than 4, 5-11 dark rufous.

Mouthparts. Labrum short and transverse, over three to four times wider than long, with lateral oval depressions; metallic green to blue-green with bronze to violet metallic reflections anteriorly; median teeth slightly rufous, anterior margin tridentate, weakly produced mesally, with six to eight submarginal setae. Mandibles elongate, basal half testaceous, apically rufous; teeth, slightly tinged with a metallic green luster at the middle, 3rd pre-apical incisor elongate and acute. Maxillary and labial palpi testaceous, the last palpomere metallic brown-green.

Prothorax. Pronotum subsquare, convex and dorsally globose, slightly wider than long, with anterior and posterior constrictions shallow, collars narrow, postero-lateral angles small, not produced; disc feebly wrinkled transversely with wavy striae, more coarsely along the anterior collar. Pronotum dark bronze to metallic blue-green with violet reflections in anterior and posterior constrictions; anterior and posterior collars, as well as postero-lateral angles, somewhat lighter, shiny. Prosternum and propleurae smooth, glabrous, with violaceous reflections; a few white, erect setae (or setal pits) appear adjacent to the antero-ventral border of proepisterna.

Pterothorax. Mesepisterna mostly smooth with a few white setae ventrad; shiny violaceous-black, metallic blue or cuprous-green. Coupling sulcus consists of a deep pit just above the middle of the mesepisterna. Mesepimera, the posterior margin of the metepisterna, and lateral margins of the metasternum clothed with white recumbent setae. Sterna and metepisterna metallic green with golden, bluish or violet reflections.

Elytra subparallel, broader than width of head across eyes, dull black with a bluish to violet metallic luster (especially on shoulders, at sides, and posteriorly on disc), shiny blue-green at base; female mirror spot consisting of a poorly defined, punctate, metallic blackish-violet areola. Elytra typically six spotted: humeral dot (present in both sexes), sub-humeral dot (roundish, sometimes slightly oblique), marginal dot (tending to subtriangular in shape), discal dot (small, obliquely placed just behind the marginal dot), sub-apical and apical dots (the latter one transverse, comma-shaped, more or less narrowly elongate along the elytral margin). Apex of elytra evenly rounded, slightly retracted; sutural spine nearly lacking in male, very small in female. Epipleura rufous to light bronze.

Legs. Pro- and mesocoxae and lateral margins of the metacoxae clothed with recumbent white setae; femora with erect, curved setae along the ventral margin. Trochanters testaceous, remainder of legs metallic light greenish- to violaceous-bronze.

Aedeagus short, fusiform, tapering, with a short, straight, apical beak.

Distribution. Philippine Islands: Mindanao I. (Surigao del Norte). In the time of Böttcher and Baker the city of Surigao was located in Surigao Province, which has since been divided into Surigao del Norte and Surigao del Sur, Surigao being in the former. Böttcher's

specimens probably were collected in the vicinity of Surigao city, now in Surigao del Norte.

LOCALITY LABEL DATA. MINDANAO. SURIGAO DEL NORTE?: “Surigao, Mindanao, Baker [*printed*]; Type, W. Horn [*printed*]; Holotypus [*red printed label*]”, holotype (1 ♀ DEI). “Philippinen [*printed*], Mindanao, Surigao [*handwritten*] (*on reverse*: S. Boettcher, 11.1915 [*handwritten*])” (1 ♂ ZMB). “Surigao, Mindanao” (1 ♀ DEI).

Remarks. The two male specimens collected by Böttcher at “Mindanao, Surigao” differ from each other in several characters. The larger specimen (considered to represent *microcephala*) is more robust with the aedeagus short, fusiform, tapering, with a short, straight, apical beak. The smaller is less robust with the aedeagus having a longer beak terminating in a slightly button-ended apex; this seems to place it closer to *milanae* which has the aedeagus short and conspicuously button-ended. As a matter of fact, the shape of the aedeagus apex differs slightly in all the four male specimens examined (*microcephala* and *milanae*). The specimens from Mindanao (that we believe represent the true *microcephala*) have the aedeagus either short, straight and blunt (*microcephala*?) or somewhat longer and slightly button-ended (*milanae*?).

The paucity of specimens of this species and variability of those available for study create this difficult taxonomic problem. The shape of the aedeagus by itself indicates that at least two different species are involved. However, body color, elytral maculation and other characters (including collection data) give the impression that they are conspecific. Although *microcephala* and *milanae* may turn out to be conspecific, it is more likely that future research will confirm that these two are good species. Also, series of specimens may show that this is a complex of three or more closely related or cryptic species.

2. *Thopeutica (Thopeutica) milanae* Wiesner (fig. 3 a-f)

Thopeutica (Thopeutica) milanae Wiesner, 1992a: 128 (figs. 1-5) [“Leyte:Visca N Baybay”, 2 ♂♂ 3 ♀♀]. Wiesner, 1992b: 171. Lorenz, 1998: 51.

Type Specimens. Holotype, ♂, from Leyte (Visca N Baybay, primary forest, 200-500m.; 2 March 1991), in SMNS. Three paratypes with the same locality data (1 ♀, 2 March 1991, SMNS; 1 ♂, 1 ♀,

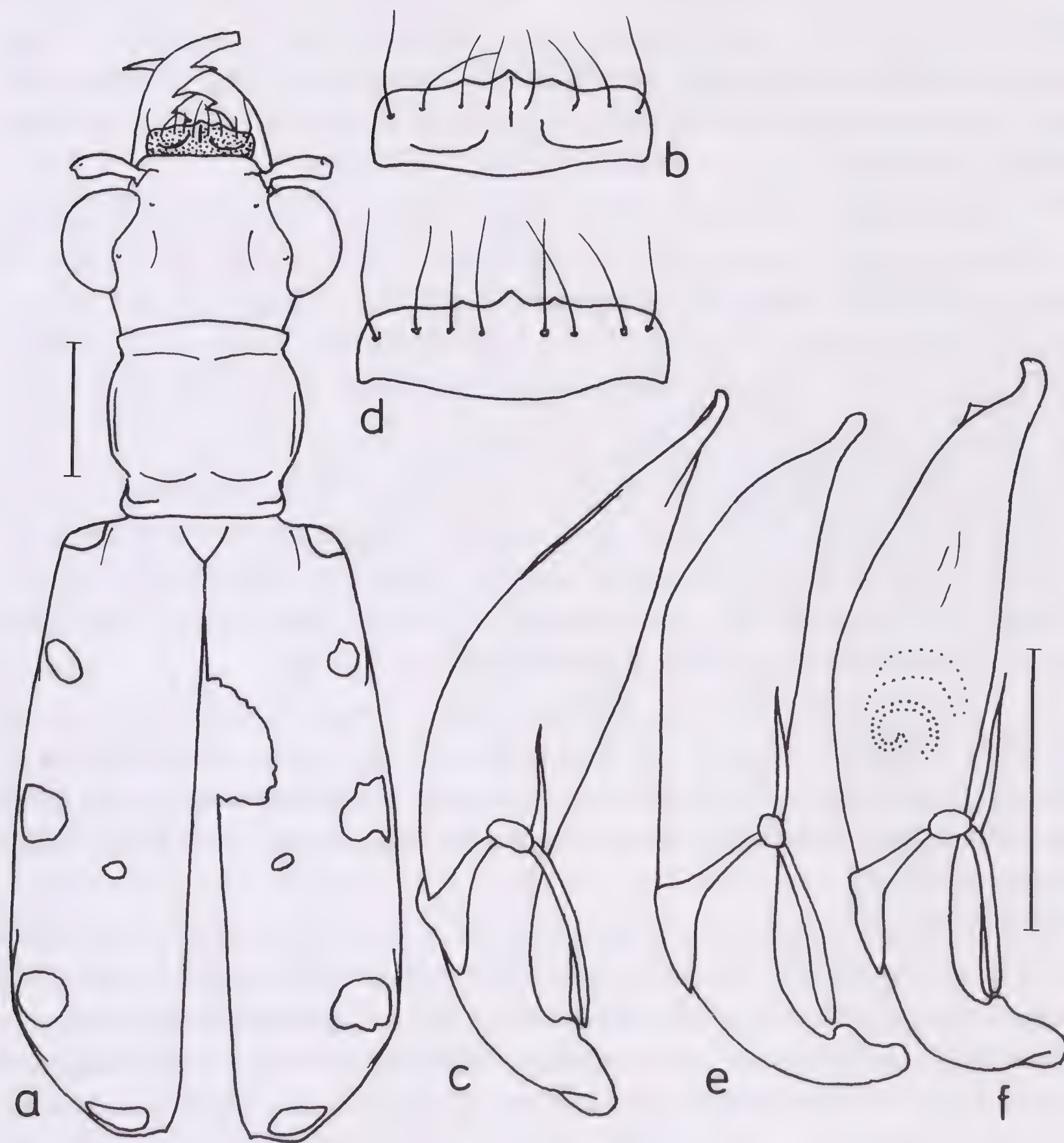


Fig. 3 - *Thopeutica (Thopeutica) milanae* (Wiesner, 1992). ♂ from "Philippinen, Mindanao, Surigao" (ZMB): a. habitus, b. labrum, c. aedeagus; ♀ from "Oras, E. Samar" (FCC): d. labrum; holotype ♂ (SMNS): e. aedeagus (from WIESNER, 1992); ♂ from "Luzon" (ZMB): f. aedeagus. Scale-lines: 1 mm.

22 February 1991, JWC); one paratype, ♀, also from Leyte (ViSCAN Baybay, secondary forest, 100-200 m, 27 February 1991, SMNS) (WIESNER, 1992a).

Specimens examined. Nine, including the two paratypes from J. Wiesner's collection. An additional male specimen from Surigao, Mindanao (ZMB), one male specimen from Luzon (ZMB) and one female specimen from Samar (FCC) are also provisionally assigned to this species.

Diagnosis. Length: 7.3-8.2 mm (without labrum). Very similar to *microcephala*, however smaller, narrower, more gracile. Sides of pronotum more rounded. Female mirror spot readily apparent, consisting of a large rounded, punctate shiny area metallic violet in color. Male aedeagus short, fusiform, tapering, with a short, hooked apical tip.

Redescription. *Head* proportionately small, glabrous, with eyes moderately salient; blue-green to violet, with green reflections on clypeus, antennal plates, eyes, and cheeks. Sculpture of head includes very fine concentric striae on frons and vertex, fine longitudinal striae entad of eyes with fine transverse wavy wrinkles behind on neck; genae longitudinally striate, antennal plates smooth.

Antennae slender, long, reaching the sub-apical spot of the elytra in male, slightly shorter (a little beyond the elytral midpoint) in female; scape metallic green to blue-green, antennomeres 2-4 dark metallic violet, nearly glabrous, 5 considerably longer than 4, 5-11 dull rufous-brown.

Mouthparts. Labrum short and transverse in both sexes, over three to four times wider than long, metallic green to blue-green, narrowly rufescent in front of middle teeth; anterior margin tridentate medially, the middle tooth more evident than the lateral ones; 6 submarginal setae near the anterior edge and occasionally two additional setae mesally on the disc. Mandibles elongate and slender, evenly rounded from base to apex; basal half testaceous, apically metallic greenish-black (to rufous), teeth more or less rufous; third pre-apical incisor elongate and acute. Maxillary and labial palpi testaceous, the terminal palpomere metallic greenish-black.

Prothorax. Pronotum subsquare, approximately as long as wide, disc with fine and transverse wrinkles shallowly impressed, somewhat raised and dorsally globose; postero-lateral angles small to obsolete, anterior and posterior constrictions clearly delineated; colour metallic

blue-green to violet with some green reflections especially on postero-lateral angles. Propleura smooth, metallic blue-green to violet. Prothorax glabrous, except for a narrow patch of white erect setae (or pits) located along and near the pleuro-sternal suture.

Pterothorax. Mesepisterna mostly smooth, shiny violaceous black, with a few white setae ventrad. Female coupling sulcus consists of a deep pit just above the middle of the mesepisterna. Mesepimera, the posterior angle of metepisterna and the sides of metasternum sparsely clothed with recumbent white setae. Sterna and metepisterna metallic green with golden, bluish or violet reflections.

Elytra dull black with a bluish-green to violet metallic luster (especially at the shoulders, sides and toward the apex of the disc), wider than width of head across eyes, slightly ampliased posteriorly. Basal margin between humeral angles and scutellum smooth, shiny blue-green and metallic; basal half of elytra granulate-punctate with strong microsculpture, apical half with increasingly shallow punctures and reduced microsculpture, elytral tip smooth and slightly shiny. Female mirror spot readily apparent, consisting of a large rounded, punctate shiny area metallic violet in colour. Elytral maculation typically six spotted: humeral dot (large, roundish, present in both sexes), sub-humeral dot (slightly smaller and oblique), marginal dot (tending to subtriangular or rectangular in shape), discal dot (very small, roundish, obliquely placed just behind the marginal dot), sub-apical and apical dots (the latter one transverse, comma-shaped, more or less narrowly elongate along the elytral margin). Apex of elytra serrulate, evenly rounded, slightly retracted, sutural spine very small to nearly lacking. Epipleura metallic dark bronze to violet.

Legs. Anterior sides of the pro- and mesocoxae and lateral margins of the metacoxae with recumbent white setae. Trochanters testaceous to rufous, femora dark bluish-green in basal half, remainder of the legs metallic dark bronze to violet.

Abdomen. Abdominal sterna punctato-setose, clothed (except for the first two) with recumbent white setae.

Third visible sternum with four submarginal tactile setae. Sterna metallic golden-green to blue-green with violet reflections.

Aedeagus short, fusiform, tapering, with a short, hooked tip.

Distribution. Philippine Islands: Samar I. (Eastern Samar); Leyte I. (Leyte); Mindanao I. (Surigao del Norte, Davao Oriental); Luzon I.:? [doubtful record].

LOCALITY LABEL DATA. LUZON: "Hist.-Coll. Nr. 42461, Luzon, Coll. Schaum" (1 ♂ ZMB, doubtful record!). SAMAR. EASTERN SAMAR: "E. Samar: Oras, 20.IV.1994" (1 ♀ FCC). LEYTE. LEYTE: "ViSCA N Baybay, prim. forest, 200-500m, leg. Schawaller & al., 22.2.1991", paratypes (1 ♂, 1 ♀ JWC; TRAUTNER & SCHAWALLER 1996). "Ormoc, Tungunan, 24 Nov. 1966, Fr. E. Schoenig" (1 ♂ CMNH, abdomen missing!). MINDANAO. SURIGAO: "Philippinen [*printed*], Mindanao, Surigao [*handwritten*] (*on reverse*: S. Boettcher, 9.11.15 [*handwritten*])" (1 ♂ ZMB). DAVAO ORIENTAL: "Boston, Mt. Agtuuganon Camp 55, 29.V-7.VI.1996, 1020m, light trap, R.A. Müller, A. Buenafe & L. Gorostiza leg." (1 ♂ FCC; 1 ♀ RMNH). BUKIDNON: 30.III.2002 (1 ♀ CC).

Remarks. See remarks under *microcephala*. The few specimens examined were insufficient to allow confidence in the range of variability of this species (as well as for *microcephala*). Validation of this species complex will have to await acquisition of additional specimens. For the time being at least, *milanae* is tentatively considered to be a distinct species. Its habitat on Leyte I. is illustrated in fig. 25.

3. *Thopeutica (Thopeutica) angulihumerosa* (W. Horn) (fig. 4 a-d)

Cicindela anguli-humerosa W. Horn, 1929: 8 ["Philippinen, ohne genauen Fundort aus der Sammlung Ehlers Van de Poll", 1 ♂ ♀; "Insel Samar, von F. Baker gesammelt", ♀ ♀]. W. Horn, 1930: 4; 1938: pl. 47, figs. 27-28. Döbler, 1973: 357. Erwin & House, 1978: 236.

Cylindera (Thopeutica) angulihumerosa (W. Horn). Schilder, 1953: 547.

Diotophora angulihumerosa (W. Horn). Rivalier, 1961: 137. Wiesner, 1980: 125.

Thopeutica (Thopeutica) angulihumerosa (W. Horn). Cassola, 1991: 522. Wiesner, 1992b: 171.

Type Specimens. HORN (1929) stated that *angulihumerosa* was described from two specimens (male and female) from the Ehlers Van de Poll collection (generically labeled "Ins. Philipp." without amplification), as well as several female specimens (number not given) collected by F. Baker on Samar Island. He further stated that the types (syntypes) were in his and the USNM collections; he did not designate any one specimen as "holotype" in his description. DÖBLER (1973) listed syntypes as follows: 1 ♂ 1 ♀, Ins. Philippinen, ex Coll. V. De Poll, and 1 ♀, Island Samar, leg. Baker, in the DEI collection. Three additional syntypes are in the USNM ("Island Samar, Baker"), thus six syntypes in all.

ERWIN & HOUSE (1978) mistakenly identified one of the USNM syntypes as the holotype rather than lectotype. We herein designate as lectotype this female specimen (with pronotum damaged at left

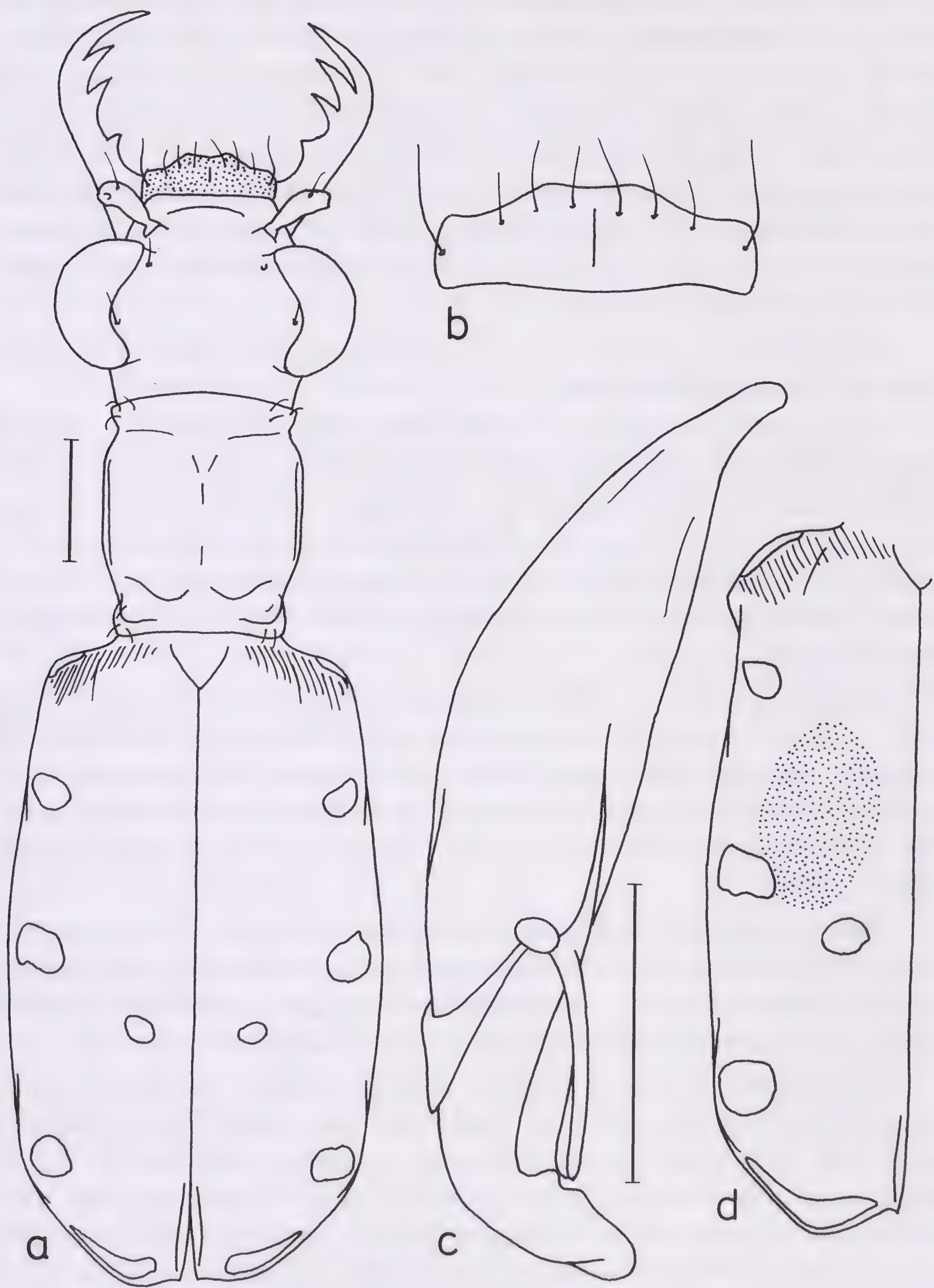


Fig. 4 - *Thopeutica* (*Thopeutica*) *angulihumerosa* (W. Horn, 1929). Paralectotype ♂ (DEI): a. habitus, b. labrum, c. aedeagus; paralectotype ♀ (DEI): d. left elytron. Scale-lines: 1 mm.

posterior corner, left mesotarsus missing) which has the following five labels: (1) "Island/Samar/Baker" [*printed*]; (2) "Typus" [*red printed label*]; (3) "Type USNM/41842"; (4) "Cicindela/anguli-hume-/rosa W. H. Typen" [*folded white label in W. Horn's handwriting with a printed line at the bottom*], "Dr. W. Horn det., 1928"; (5) "Cicindela/angulihumerosa/W. Horn/det. W. Horn" [*hand printed white label with lateral red margins*]. The remaining five syntypes are redesignated paralectotypes. Samar Island becomes the restricted type locality ("patria restricta") of the species.

Specimens examined. Eleven specimens (including lectotype and five paralectotypes).

Diagnosis. Length: 7.3-8.2 mm (without labrum). Female unmistakable, with a peculiar protruding humeral callus and a readily apparent mirror spot (consisting of a large rounded, punctate shiny area metallic violet in colour). Pronotum elongate, subrectangular in male, with the four corners setose; postero-lateral angles well developed. Male aedeagus short, tapering, squat, with a short, slightly down-curved apex.

Redescription. *Head* glabrous, dark bronze to shiny black with a slight violaceous luster; green to golden-green reflections on clypeus, antennal plates, genae and sides of neck. Very fine concentric striae on frons and vertex, coarser longitudinal striae entad of eyes, fine transverse wavy wrinkles behind eyes on neck; genae longitudinally striate.

Antennae slender, long, surpassing the basal half of the elytra in male, a bit shorter in female; scape and antennomere 2 metallic bronze with greenish reflections, antennomeres 3-4 nearly glabrous, metallic violet, 5 longer than 4, 5-11 dark rufous to blackish-brown.

Mouthparts. Labrum metallic bronze with a violaceous luster, some green reflections at base; short and transverse, more anteriorly produced in female, anterior margin obtusely truncate to feebly unidentate, four to six submarginal and medial setae on each side. Mandibles narrow and very elongate, testaceous at base, rufous to dark brown apically and on teeth, with variable amount of metallic green luster mesally, appearing apically bifid with the 1st preapical incisor closer to the apical tooth than to the 2nd preapical incisor; 3rd preapical incisor triangular exposed beyond the labrum. Maxillary and labial palpi testaceous, the last palpomere metallic brown-green; penultimate palpomere of maxillary palpi also more or less darkened.

Prothorax. Pronotum elongate, longer than wide, subrectangular in male, sub-trapezoidal (narrowed anteriorly) in female, with the four corners setose (setae often abraded); postero-lateral angles well developed, disc rather flattened, glabrous, finely and shallowly wrinkled to nearly smooth. Colour dark bronze to shiny black, with some green reflections in transverse constrictions; postero-lateral angles with a cuprous metallic luster. Propleura finely wrinkled, with long, white erect setae near the anterior margin and on the ventral half; prosternum setose. Prothorax ventrally bronze-green with golden to violaceous reflections.

Pterothorax. Mesepisterna mostly smooth, glossy black and glabrous, metallic cuprous green ventrad; mesepisternum of female shallowly concave, with the posterior margin depressed along the pleural suture, the coupling sulcus consisting of a vertically-oriented pit that is evident at the most posterior (mesal) point of this depression. Mesepimera, metepisterna, anterior and lateral portions of the metasternum as well as its posterior rim, and the postero-lateral corners of the mesosternum clothed with dense, white recumbent setae. Epimera, metasternum and metepisterna metallic green with golden and cuprous reflections.

Elytra relatively long, wider than head with eyes, subparallel-sided; humeral angles rounded in male, with a produced, conspicuous, oblique humeral callus in female; dull, matte black, except at base and around the humeral callus where it is shiny violaceous-black; scutellum more or less metallic green. Female mirror spot very large, irregularly oval-shaped, glossy black, posteriorly attaining the middle elytral dots. Elytral maculation typically six-spotted, dots white except the humeral one which is yellow: humeral dot (in both sexes, surrounded by the shiny violaceous black basal area), sub-humeral dot (slightly oblique), marginal dot (tending to subtriangular in shape), discal dot (obliquely placed behind the marginal dot), sub-apical and apical dots (the latter one transverse, very elongate, comma-shaped). Apex of elytra microserrulate, rounded, slightly retracted in female; sutural spine short, sharp, very small in both sexes. Epipleura rufous to dark bronze.

Legs. Anterior sides of pro- and mesocoxae and lateral margins of metacoxae densely clothed with recumbent white setae; femora with curved hairs along ventral margin. Trochanters testaceous, remainder of the legs dark bronze with green to violaceous reflections, "knees" and tibiae lighter, rufous.

Abdomen. Abdominal sterna dark bronze with cupreous to blue-green metallic reflections; punctato-setose, fully clothed with fine white recumbent setae, each with two to three submarginal pairs of tactile setae.

Aedeagus short, tapering, squat, with a short, slightly down-curved apex.

Distribution. Philippine Islands: Samar I.; Leyte I.; Mindanao I. (Davao Oriental).

LOCALITY LABEL DATA. PHILIPPINES: “coll. Ehlers V. de Poll [*printed*], Ins. Philipp. [*handwritten by W. Horn*]; Type W. Horn [*printed*]; Syntypus [*red printed label*]”, paralectotypes (1 ♂, 1 ♀ DEI). SAMAR: “Island Samar, Baker [*printed*]; Typus [*red printed label*]; Type USNM/41842; Cicindela/angulihume-/rosa W. H. Typen [*handwritten, followed by printed*]; Dr. W. Horn det., 1928 [*folded white label with Walther Horn’s hand writing*]”, lectotype (1 ♀ USNM). “Island Samar, Baker [*printed*]; Type W. Horn [*printed*]; Mus. Wa-/shington [*handwritten by W. Horn*]; Syntypus [*red printed label*]; Coll. W. Horn, DEI Eberswalde [*printed*]; anguli-hu/merosa W.H. [*handwritten by W. Horn*]”, paralectotype (1 ♀ DEI). “Island Samar, Baker [*printed*]; Typus [*red printed label*]; anguli-humerosa W. Horn, paratype USNM, 41842 [*red label*]; Property USNM [*printed*]”, paralectotype (1 ♀ USNM); *with additional label*: Cicindela anguli-humerosa W. Horn, det. W. Horn, paratype [*handwritten*]”, paralectotype (1 ♀ USNM). LEYTE. LEYTE: “8 km N Baybay, ViSCA, Pacubasan River, Bato, 150 m, 17-19.V.1994, P. Schütz” (1 ♂ AOC). MINDANAO. DAVAO ORIENTAL: “Philippine Is., Mindanao, Davao Pr., Todaya, June 3, 1974, Fr. E. Schoenig” (1 ♀ CMNH). “Boston, Mt. Agtuuganon, Camp 55, 29.V-7.VI.1996, 1020 m, lighttrap, R.A. Müller, A. Buenafe & L. Gorostica” (1 ♀ FCC; 2 ♀ ♀ RMNH).

Remarks. This species is one of the two known with a peculiar protruding humeral callus in the females.

4. *Thopeutica (Thopeutica) rolandmuelleri* Cassola (fig. 5 a-e)

Thopeutica (Thopeutica) rolandmuelleri Cassola, 2000: 504-506 (fig. 2a-e)

Type Specimens. This recently discovered species was known so far by the type series only (CASSOLA, 2000), but two further specimens have been now added.

Specimens examined. Twelve specimens, including the whole type series (10 specimens).

Diagnosis. Length: 10.5-11.5 mm (without labrum). Similar to *Th. angulihumerosa*, however distinctly larger in size, with a longer pronotum, proportionally smaller female elytral mirror, stronger

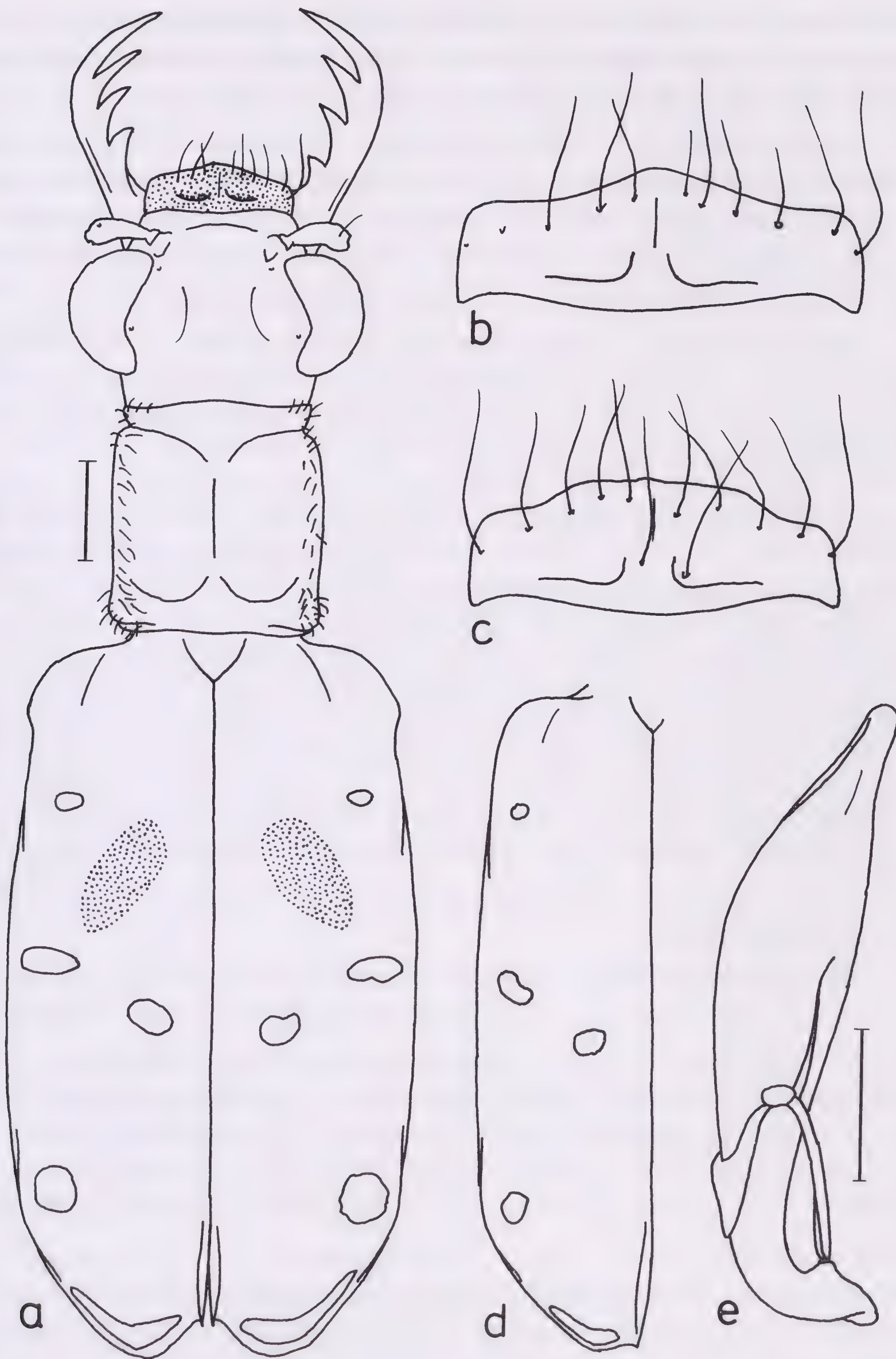


Fig. 5 - *Thopeutica (Thopeutica) rolandmuelleri* Cassola, 2000. Allotype ♀ (RMNH): a. habitus, b. labrum; holotype ♂ (RMNH): c. labrum, d. left elytron, e. aedeagus. Scale-lines: 1 mm.

sutural spine in both sexes, straighter blunt apex of male aedeagus, and deeper female mesepisternal coupling sulcus. Females easily recognized by the protruding humeral callus of the elytra.

Redescription. *Head* glabrous, dark bronze with a slight violaceous luster, golden-green on clypeus and genae; antennal plates shiny cuprous-green, smooth. Very fine longitudinal striae entad of eyes and sides of frons, concentric on frons and vertex, wavy fine transverse wrinkles on neck; genae longitudinally striate.

Antennae slender, long, surpassing the basal half of the elytra in male, shorter in female; scape cuprous-green, antennomere 2 metallic green, glabrous; antennomeres 3-4 dark violaceous, nearly glabrous, 5 longer than 4, 5-11 blackish-brown.

Mouthparts. Labrum short and transverse, distinctly carinate mesally, the anterior margin obtusely truncate to subtriangular, slightly more produced anteriorly in female; five to six submarginal setae on each side (10-12 in all), and sometimes with 1-2 additional mesal discal setae; metallic greenish-bronze with some cuprous to violaceous reflections laterally. Mandibles narrow and very elongate, testaceous at base, metallic cuprous-green in the middle outer part, shiny black on apical and pre-apical teeth; 3rd preapical incisor triangular, exposed beyond the labrum. Maxillary and labial palpi testaceous, the last palpomere metallic dark green; penultimate maxillary palpomere darkened, occasionally 3rd palpomere more or less tinged with a violaceous metallic hue.

Prothorax. Pronotum elongate, distinctly longer than wide and narrowed anteriorly; subrectangular in male, trapezoid-shaped in female; with fine, short and irregular transverse wrinkles on the disc. Pronotal disc glabrous; lateral margins and propleurae setose, with pale curly setae especially dense posteriorly. Colour dark bronze (as on head), with some cuprous reflections at sides, metallic bluish- or golden-green in transverse grooves and postero-lateral angles. Prosternum setose.

Pterothorax. Mesepisterna (males), mesepimera, metepisterna and sterna bronze to cuprous-green, more or less densely covered with white recumbent pubescence; mesepisternum of female glabrous, wide, flat, glossy violaceous-black, with coupling sulcus consisting of a deep pit adjacent to and under the anterior mesepimeral suture.

Elytra elongate, clearly wider than width of head across eyes, subparallel-sided; shoulders slightly rounded in male, with a conspicuous, protruding, oblique humeral callus in female, similar to that of *angulihumerosa* but slightly less abruptly produced laterally. Colour dull brownish-black, with some greenish reflections at base and laterally; scutellum metallic cuprous to green. Female mirror spot relatively smaller than in *angulihumerosa*, oval-shaped, shiny violaceous-black, obliquely placed in front half of elytra some distance from the surrounding elytral dots. Elytral maculation typically six-spotted, dots relatively small, rounded, well-separated from each other, white except the humeral one which is yellowish; the apical spot, in contrast, is transverse, elongate and comma-shaped. Apex of elytra microserulate, rounded, conspicuously retracted in female; sutural spines small but evident in male, longer, sharp, overlapping each other in female. Epipleura dark metallic bronze.

Legs slender, elongate, nearly glabrous. Coxae densely clothed with white recumbent setae, trochanters rufous-testaceous; femora slightly club-shaped, pubescent, with curved white setae especially behind; basal half golden-green, "knees" tinged with metallic cuprous-green, tibiae and tarsal segments bluish-black with violaceous reflections.

Abdomen. Abdominal sterna fully clothed with fine recumbent pubescence; dark greenish-bronze with cuprous to golden reflections laterally.

Aedeagus fusiform, tapering, with a short, straight blunt apex.

Distribution. Philippine Islands: Mindanao I. (Davao Oriental, Bukidnon, South Cotabato).

LOCALITY LABEL DATA. MINDANAO. DAVAO ORIENTAL: "Boston, Mt. Agtuuganon, Camp 55, 29.V-7.VI.1996, 1020m, light trap, R.A. Müller, A. Buenafe & L. Gorostiza", holotype (1 ♂ RMNH), allotype (1 ♀ RMNH), paratypes (2 ♂♂, 2 ♀♀ RMNH; 2 ♂♂, 2 ♀♀ FCC). BUKIDNON: 30.III.2002 (1 ♂ SCC). SOUTH COTABATO: Manobo Tasaday Forest Reserve, Mt. Tasaday, 124° 32 E - 6° 18 N, 1000-1100 m, 15.VI.1994, secondary vegetation, Pascal Lays (1 ♀ IRSNB).

Remarks. *Th. rolandmuelleri* is clearly a close relative of *angulihumerosa* that is also known from Mindanao, as well as from Samar and Leyte Islands. The two species appear to be sympatric (perhaps also syntopic), living in the vicinity of Camp 55 of Mt. Agtuuganon, together with *Th. virginalis* (W. Horn, 1901). Further field observations must be done to ascertain ecological niche separation.

5. *Thopeutica (Thopeutica) suavis* (W. Horn) (fig. 6 a-d)

Cicindela suavis W. Horn, 1896a: 151 ["Albay (Luçon merid.: Whitehead 94); typus in coll. Rotschild, specim. alt. in mea", 2 ♀ ♀]. W. Horn, 1905: 33; 1907: 78; 1915: 280, 283, 286; 1926: 164; 1938: pl. 48 (fig. 25). Schultze, 1916: 8. Döbler, 1973: 413.

Cylindera (Thopeutica) suavis (W. Horn). Schilder, 1953: 547.

Diotophora suavis (W. Horn). Rivalier, 1961:137. Wiesner, 1980: 125.

Thopeutica (Thopeutica) suavis (W. Horn). Cassola, 1991: 522. Wiesner, 1992b: 171.

Type Specimens. Holotype, ♀, in Rothschild collection (not seen); paratype, ♀, in DEI collection (DÖBLER 1973).

Specimens examined. Seven specimens (including the female paratype).

Diagnosis. Length: 8.1-8.7 mm (without labrum). Head and pronotum dark bronze with a violaceous metallic luster. Pronotum subsquare, distinctly wrinkled and shagreened, with a few white setae along lateral margins, postero-lateral angles small. Elytra with the middle dots nearly aligned on a transverse line. Female mirror spot very small, indistinct, reduced to a poorly defined spot of metallic luster. Sutural spine small but evident in both sexes. Aedeagus small, squat, fusiform, with a slightly blunt apex.

Redescription. *Head* glabrous, dark bronze with violaceous reflections, metallic blue-green to blue-violet on clypeus, antennal plates, border of eyes, and genae. Sculpture consisting of very fine concentric striae on frons and vertex, fine longitudinal striae entad of eyes; fine, transverse wavy wrinkles behind eyes on neck; genae longitudinally striate, antennal plates smooth.

Antennae slender, attaining the basal half of the elytra in male, shorter in female; scape and antennomere 2 metallic golden-green to bluish-green; antennomeres 3-4 metallic violet, nearly glabrous, 5 longer than 4, 5-11 dark rufous to blackish-brown.

Mouthparts. Labrum metallic green, violet near the anterior margin; short and transverse, over three times wider than long, the anterior margin feebly tridentate, weakly produced mesally; four to five submarginal setae on each side. Mandibles elongate, testaceous on basal half, rufous in the front half and on teeth, tinged with a green metallic luster in the middle. Maxillary and labial palpi testaceous, the last palpomere metallic brown-green; penultimate segment of maxillary palpi sometimes darkened.

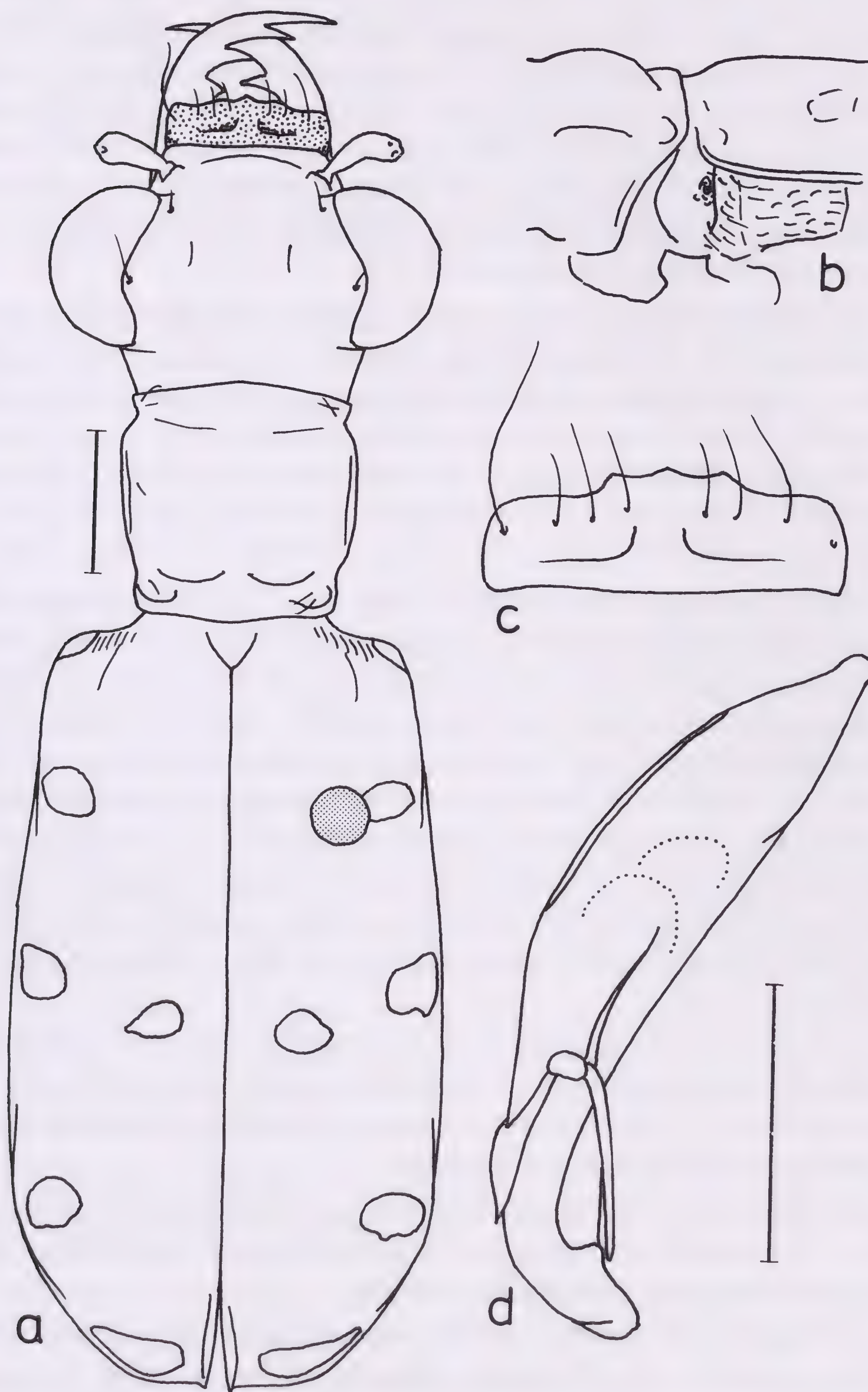


Fig. 6 - *Thopeutica (Thopeutica) suavis* (W. Horn, 1896). Paratype ♀ (DEI): a. habitus, b. coupling sulcus; ♂ from "N. Luzon, Whitehead" (FCC): c. labrum, d. aedeagus. Scale-lines: 1 mm.

Prothorax. Pronotum subsquare, moderately globose (approximately as long as wide), distinctly wrinkled and shagreened, with a few white setae along lateral margins; postero-lateral angles small. Colour dark bronze with violaceous reflections on disc, bluish-green on anterior and posterior collars, violet in transverse constrictions. Propleura smooth with a few white erect setae near the antero-ventral margin; dark bronze with violaceous reflections dorsally, more greenish ventrally. Prosternum glabrous.

Pterothorax. Mesepisterna mostly smooth with a few white setae ventrally; glossy violaceous-black (female) to metallic bluish-green (male); coupling sulcus consisting of a pit located slightly ventrad of the middle along the mesopleural suture. Mesepimera, metepisterna, and anterior and lateral margins of metasternum clothed with white recumbent setae. Sterna and metepisterna metallic golden-green to bluish-green.

Elytra relatively short, slightly wider than head across eyes, subparallel-sided; dull, matte black, with some green to blue-green reflections on base and shoulders. Female mirror spot very small, indistinct, consisting of a poorly defined area of metallic luster. Elytral maculation typically six-spotted: humeral dot (present in both sexes), sub-humeral dot (slightly oblique), marginal dot (tending to subtriangular in shape), discal dot (obliquely placed just behind the marginal dot), sub-apical and apical dots (the latter one transverse, elongate, comma-shaped). Apex of elytra microserulate, evenly rounded, sutural spine small but evident in both sexes. Epipleura dark rufous to metallic bronze.

Legs. Pro- and mesocoxae and lateral margins of metacoxae clothed with recumbent white setae. Trochanters testaceous; "knees" and tibiae more or less testaceous-rufous; remainder of the legs metallic light greenish- to violaceous-bronze.

Abdomen. Abdominal sterna punctate, clothed with recumbent white setae; mesally, one or two long tactile setae at fixed submarginal loci; metallic golden-green to blue-green.

Aedeagus small, squat, fusiform, with a slightly blunted apex.

Distribution. Philippine Islands: Luzon I. (N ♀ S Luzon, Albay).

LOCALITY LABEL DATA. LUZON: "N. Luzon, Whitehead [*handwritten*]; suavis Horn, t. Horn [*handwritten*]; F. Bates Coll., 1911-248 [*printed*]" (1 ♂, 1 ♀ BMNH). "N. Luzon, Whitehead [*handwritten*]; suavis Horn, t. Horn [*handwritten*]; 1902-134, name passed by Dr. W. Horn, in coll. F. Bates [*printed*]" (1 ♂ FCC). "S. Luzon [*handwritten*]; Whitehead [*handwritten*]; Phillip.[*sic!*] Islands [*printed*]; Fry Coll., 1905-100 [*printed*]; Diotophora suavis W. Horn, det. C. v. Nidek 1973" (2 ♀ ♀ BMNH). ALBAY: "Albay, S. Luzon, Whitehead, 94 [*printed*]; Tring Mus. [*printed*]; Type! coll. W. Horn [*printed*]; paratypus [*red printed label*]; suavis mihi [*yellowish rectangular label, handwritten by W. Horn*]", paratype (1 ♀ DEI). "Prov. Albay, S. Luzon [*printed*]; Bänninger [*handwritten by W. Horn*]; Coll. W. Horn, DEI Eberswalde [*printed*]" (1 ♀ DEI).

Remarks. Similar to *virginea* but smaller, with more rugose and shagreened pronotum. Female coupling sulcus a foveated pit just below the middle, thus slightly lower than that of *virginea*.

6. *Thopeutica (Thopeutica) darlingtonia* n. sp. (fig. 7 a-e)

Diagnosis. Length: 8.5-9.5 mm (without labrum). Similar to *Th. fugax*, but with differently-shaped male aedeagus and female coupling sulci. Elytra of females with a small, black, oval-shaped mirror spot, slightly oblique in orientation, placed well away from the suture. Sutural spine of elytral apex small to very small. Aedeagus fusiform, squat, with a short blunt apex.

Description. *Head* with surface strongly microsculptured, giving a rough appearance, frons and middle of vertex very finely striate with coarser longitudinal striae entad of eyes and on genae; sculpture of head behind eyes irregularly transverse, shallow and somewhat coarse; glabrous except for setae at fixed loci. Colour black with some purplish or greenish reflections on vertex, frons and around eyes; antennal plates, clypeus and genae more or less metallic green with localized golden or bluish reflections.

Antennae extending to approximately half the elytral length; scape and antennomere 2 metallic green, antennomeres 3-4 violaceous-black, nearly glabrous, 5 longer than 4, 5-11 dark rufous-brown.

Mouthparts. Labrum piceous to violaceous, tinged with metallic green laterally; short and transverse, about three times wider than long; produced anteriorly at the middle, with a small protruding median tooth (nearly effaced in some specimens); eight to twelve submarginal setae and one to three additional discal setae mesad, near the base, but with considerable variability in the number of submarginal and discal

setae present (beyond the basic four pair and one pair respectively) and the symmetry of their placement. Mandibles testaceous at base, tinged with metallic green-violet in the middle, apically (including incisors) rufous; weakly bifid (apical tooth and 1st preapical incisor), 3rd pre-apical incisor strongly curved on anterior margin to obliquely truncate, acute, and partially covered by labrum when mandibles crossed in repose. Maxillary and labial palpi testaceous, with the last two palpomeres of the former and the last one of the latter more or less metallic green.

Prothorax. Pronotum subrectangular, slightly longer than wide, subparallel-sided, appearing smoother than surface of head, black with some purple, green or cuprous reflections on disc and in the transverse grooves. Disc with shallow, predominantly transverse wrinkles, especially along the lateral margins and median line; transverse striae coarser on the anterior collar, posterior angles feeble; glabrous, laterally with a row of decumbent setae, anterior and posterior angles setose. Propleura with anterior half and posterior grooves clothed in long white setae (or punctures), posterior half of disc glabrous; light golden-green to dark bronze. Prosternum setose between the procoxae and propleuron, occasionally disc with 1-3 setae near the procoxae.

Pterothorax. Mesepisterna glabrous except for the ventral tip, smooth to shallowly wrinkled, cuprous (disc) to shining black (dorsal tip). Mesepisterna (ventral tip), mesepimera, metepisterna and sides of metasternum densely clothed with recumbent white setae. Coupling sulcus consisting of a dorsally narrowed anterior excavation extending ventrally from the elytral base where it becomes broader and shallower; a postero-dorsal ridge separates this from a posterior depression with a deep pit situated mesally, adjacent to the pleural suture. Mesosternum glabrous.

Elytra wider than head across eyes, subparallel-sided, relatively short, matte blackish-green with purple reflections on disc; with dense microsculpture and fine, small, evenly-spaced green granulate punctures over the entire surface (deeper basally); scutellum and base of elytra to humeral angles shiny metallic cuprous to green. Female mirror spot shiny, metallic violaceous-black, distinctly punctate, obliquely placed some distance from the suture, smaller or poorly developed in some specimens. Maculation consisting of six small spots: humeral, sub-humeral, marginal (sub-triangular to transverse), discal, subapical and apical (comma-shaped along the posterior elytral

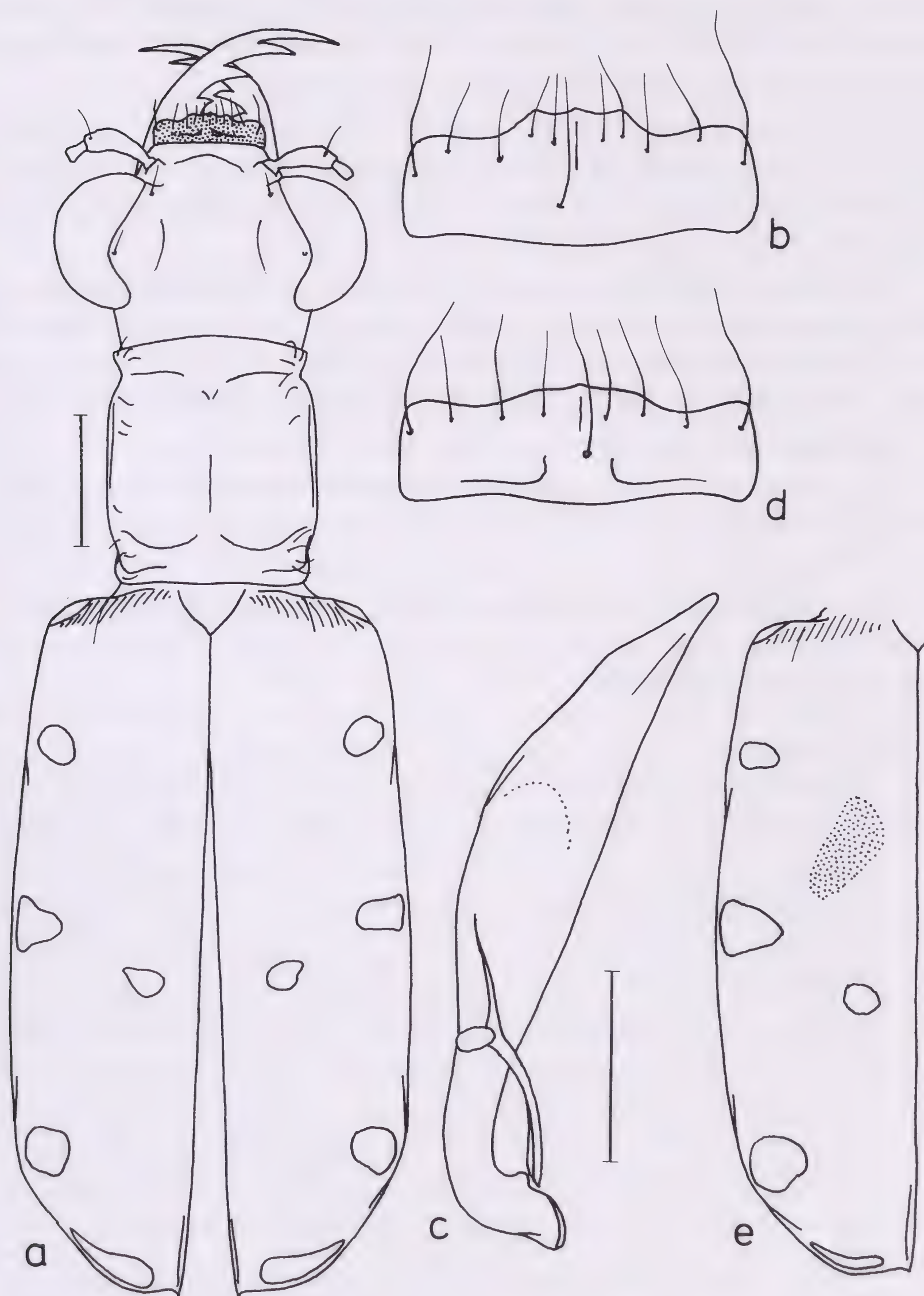


Fig. 7 - *Thopeutica (Thopeutica) darlingtonia* n. sp. Holotype ♂ (CMNH): a. habitus, b. labrum, c. aedeagus; ♀ allotype (CMNH): d. labrum, e. left elytron. Scale-lines: 1 mm.

border). Apex of elytra microserulate, evenly rounded to obtuse sutural angle; sutural tooth short to very short but distinct and sharp (in both sexes). Epipleura rufous to metallic bronze.

Legs. Pro- and mesocoxae, as well as the lateral margins of the posterior coxae densely clothed with white recumbent setae; trochanters rufous, remainder of the legs metallic dark bronze to green, with violaceous to cuprous reflections.

Abdomen. Abdominal sterna fully clothed with fine, white recumbent pubescence; two pairs of longer, fixed locus submarginal tactile setae laterad of midline (near the posterior edge) of visible sterna 3, 4 and 5. Sterna golden-green with coppery to bluish reflections laterally.

Aedeagus fusiform, squat, with a short, blunt apex.

Etymology. This species is named in honour of the late Prof. Philip J. Darlington, Jr. (1904-1983), who personally collected the holotype and allotype specimens and greatly contributed to the knowledge of the tiger and ground beetle fauna of South East Asia and Australasia.

Distribution. Philippine Islands: Luzon I. (Nueva Vizcaya, Bataan, Laguna, Batangas).

Type Specimens. Holotype, allotype and 33 paratype specimens, labeled as follows: PHILIPPINES: "Ins. Philipp. [*printed*]; Cicindela fugax Schaum [*handwritten by W. Horn*], det. W. Horn [*printed*]", paratype (1 ♀ FCC). LUZON. "Luzon [*handwritten*]; 83057 [*printed*]; coll. H.C. Vogel [*printed*]", paratype (1 ♀ ZMB). NUEVA VIZCAYA: "Calder Collection, Philippinen, Luzon [*printed*], Imugan [*handwritten*] (*on reverse*: S. Boettcher, 6.1916 [*hand-written*])" [Imugan, 9 Km W of Santa Fe], paratype (1 ♂ CMNH). BATAAN: "S.E. Bataan, Luzon Is., P.I., July-Aug. 1945, Darlington [*printed*]; borrowed ex MCZ [*printed*]", holotype (1 ♂ MCZ), allotype (1 ♀ MCZ), paratype (1 ♀ MCZ). LAGUNA: "Philippinen, Luzon [*printed*], Los Banos [*handwritten*] (*on reverse*: "S. Boettcher, 7.1914 [*handwritten by W. Horn?*])", paratypes (1 ♂, 1 ♀ ZMB; 1 ♂ FCC). "Mt. Makiling, Luzon, P. I. [*printed*], I.21.31 [*handwritten*]; J.F. Lawrence Collection [*printed*]", paratype (1 ♂ MCZ). "Mt. Makiling, Luzon, P. I. [*printed*], VII.12.32 [*handwritten*]; Coll. Ward [*blue label, handwritten*]; Cicindela suavis W. Horn [*handwritten by K. Mandl*], det. Dr. K. Mandl, 1973 [*printed*]; suavis [*handwritten*]", paratype (1 ♂ CMNH). "Mt. Makiling, Luzon, Baker [*printed*]; 3872 [*handwritten*]; Cicindela fugax Schaum [*handwritten*]; Property USNM [*printed*]", paratype (1 ♀ USNM). "Mt. Makiling, Luzon, Baker [*printed*]; Property USNM [*printed*]", paratype (1 ♀ USNM). "Mt. Makiling, Luzon, Baker [*handwritten by W. Horn*]; 3872 [*handwritten*]; Coll. W. Horn, DEI Eberswalde [*printed*]", paratype (1 ♀ DEI). "Mt. Makiling, Laguna, P. I., 400 ft elev. [*printed*], VII.21.32 [*handwritten*]; F.C. Hadden Collector [*printed*]; Cic. fugax Schaum [*handwritten by C. B. v. Nidek*], det. C. van Nidek 1954 [*printed*]", paratypes (1 ♂, 2 ♀ ITZ). "Mt. Banahao [*printed*], VI [*handwritten*], 1914, Boettcher [*printed*]; Luzon [*printed*]", paratype (1 ♀ ZMB). BATANGAS: "Tagaytay, Mt. Sungay, 400m, 17-28.VIII.1995, N. Naide-now", paratypes (3 ♂♂, 3 ♀♀ JWC; 1 ♂ FCC, 1 ♀ KWC). "Tagaytay, 400m,

Sungay, 17.VIII.1995, O. Zompro", paratypes (1 ♂, 1 ♀ JWC; 1 ♀ FCC).
 "Banga Talisay, 70m, 16-20.VIII.1995, O. Zompro", paratypes (2 ♂♂, 2 ♀♀ JWC; 1 ♂, 1 ♀ FCC).

Remarks. This species, which is very similar to *fugax*, has previously been mistaken for it in collections due to superficial similarities of size, setation and color. However, *darlingtonia* is easily distinguished from *fugax*, males by the very different shape of the aedeagus and females by the coupling sulcus consisting of a pit near the pleural suture as opposed to the deep vertical groove of *fugax* that extends beneath the humeral angle of the elytron. The aedeagus of *darlingtonia* is fusiform and squat, with a short blunt apex, that of *fugax* is slender and tapering, with the maximum width at its middle and with a long, narrow, rounded apex. *Th. darlingtonia* and *fugax* are apparently sympatric on Mount Makiling.

7. *Thopeutica (Thopeutica) boettcheri* n. sp. (fig. 8 a-d)

Diagnosis. Length: 8.0-9.5 mm (without labrum). Very similar to both *fugax* and *darlingtonia*, but elytra more rounded at sides and shape of male aedeagus different; however, confusion amongst females is possible. Female elytral mirror spot moderately large, oval-shaped, black, obliquely placed some distance from the suture. Sutural spine of elytral apex very small to absent.

Description. *Head* glabrous, densely microsculptured, mostly blackish; clypeus, antennal plates, around eyes and genae metallic green. Frons and vertex (mesally) with very fine to indistinct striae, vertex with coarse, longitudinal striae at sides, laterally behind eyes and on genae; sculpture of neck fine, transverse, somewhat coarser.

Antennae attaining approximately the mid-point of the elytra; scape and antennomere 2 more or less dark metallic green; antennomeres 3-4 violaceous-black, nearly glabrous, 5 longer than 4, 5-11 rufous-brown (the last ones progressively darkened).

Mouthparts. Labrum short and transverse, about three times wider than long, carinate with lateral depressions, piceous to violaceous-black (sometimes with metallic bluish-green tinge at base and laterally), feebly tridentate, the median tooth more anteriorly produced; nine to twelve long, submarginal setae and one to three additional discal setae mesally near base. Mandibles long, stout, testaceous at base, in the

middle tinged with metallic blue-green, and apically (including pre-apical incisors) rufous; apical tooth and 1st pre-apical incisor slender, acuminate, 3rd preapical incisor obliquely truncate, not covered by the labrum. Maxillary and labial palpi testaceous, with the last two palpomeres of the former and the last of the latter more or less metallic green.

Prothorax. Pronotum sub-rectangular, slightly longer than wide; black with bluish-green highlights, especially in transverse grooves, on postero-lateral corners and laterad; setose at anterior and posterior corners with a line of setae along lateral margins of pronotum; median longitudinal line distinct, disc shallowly, transversely wrinkled (especially mesally and along the notopleural suture), anterior and posterior collars coarsely rugose, postero-lateral angles lobate. Most of propleural disc and prosternum along the entire notopleural suture clothed with long white recumbent setae (or punctures), setation extending over the notopleural suture into the anterior and posterior grooves of the pronotum. Propleura bright violaceous-green to dark bronze.

Pterothorax. Mesepisterna glabrous, smooth to finely wrinkled, golden-bluish-green (male) to glossy black (female). Mesepisternum of female glossy black, depressed along the anterior edge, deeply at the dorsal tip between the elytra and prothorax. Coupling sulcus consists of an elongate deep dorso-ventral pit adjacent to the pleural suture and with a slight bend to the front at the ventral end. Mesepimeron, metepisternum, postero-lateral corners of mesosternum clothed with white recumbent setae; metasternum with lateral band of setae which extends to entirely encircle the mesocoxae and the proximal margin of the metacoxae.

Elytra wider than head across eyes, subparallel-sided, relatively short, dull black with a slight greenish reflectivity; basal margin and scutellum shiny metallic golden-green to violaceous. Female mirror spot moderately large, shiny, metallic violaceous-black, distinctly punctate, obliquely placed some distance from the suture. Elytral maculation consisting of six small spots: humeral (sometimes not visible from above in female), sub-humeral, marginal (sub-triangular to transverse), discal, sub-apical and apical (comma-shaped along the posterior elytral border). Apex of elytra evenly rounded, microserrulate; sutural tooth very small in both sexes, sometimes obsolete. Epipleura rufous to metallic bronze.

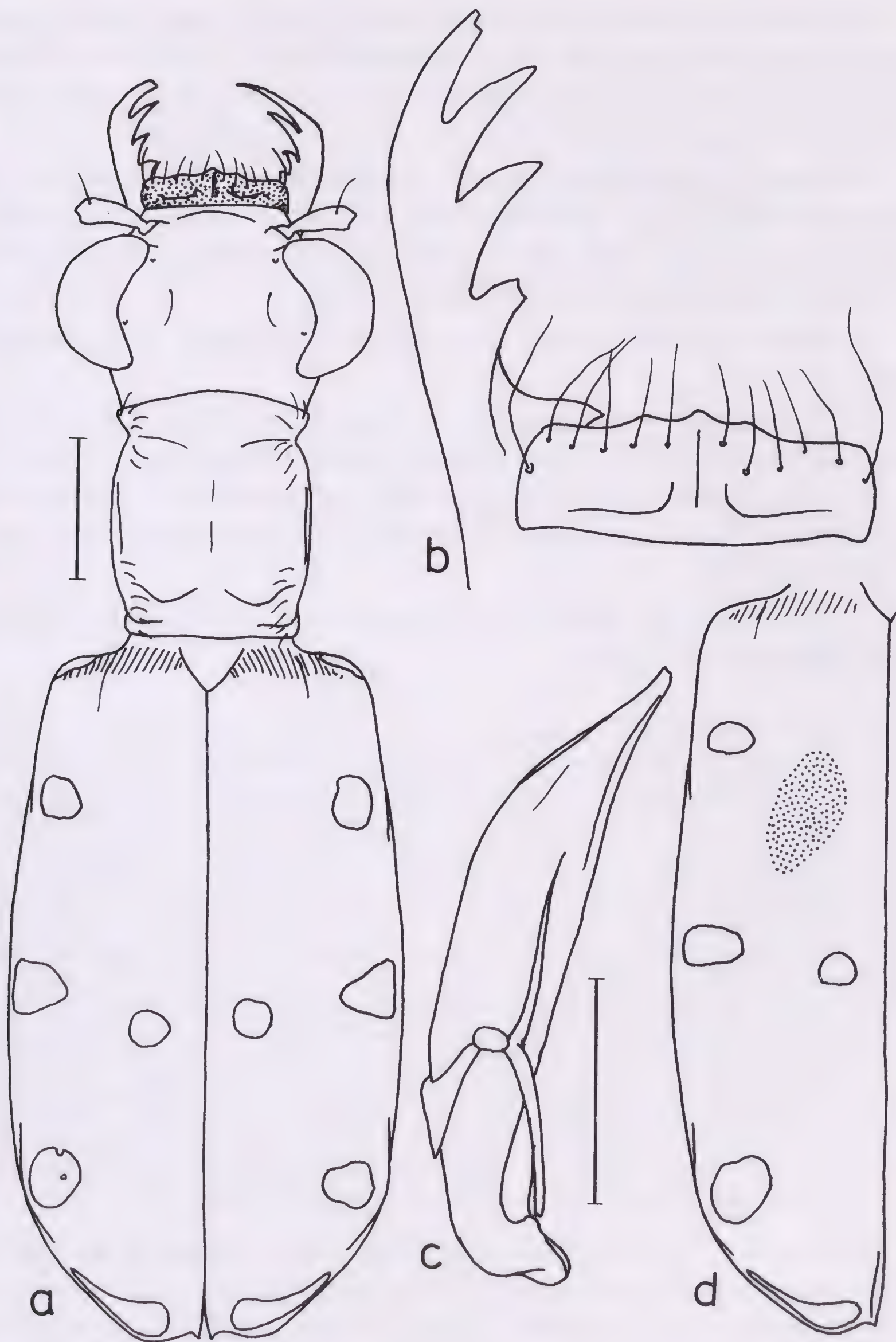


Fig. 8 - *Thopeutica* (*Thopeutica*) *boettcheri* n. sp. Holotype ♂ (ZMB): a. habitus, b. labrum and left mandible, c. aedeagus; allotype ♀ (CMNH): d. left elytron. Scale-lines: 1 mm.

Legs. Pro- and mesocoxae, as well as the lateral borders of posterior coxae densely clothed with white recumbent setae; trochanters rufous to brown, remainder of the legs metallic dark bronze to green, with violaceous to cuprous reflections.

Abdomen. Abdominal sterna bluish-green with golden to violaceous reflections, mesally clothed with fine white recumbent pubescence, laterally with thick white recumbent setae; visible sterna 3, 4 and 5 each with two pairs of tactile setae.

Aedeagus fusiform, tapering, with a moderately long, straight apex.

Etymology. The species is named in memory of Georg Böttcher (Berlin, 1890-1920), who visited the Philippines from 1914 to 1919 (HÄMÄLÄINEN & MÜLLER, 1997) and personally collected the type series of this species as well as other important specimens examined in this study.

Distribution. Philippine Islands: Luzon I. (Laguna); Mindoro I. (Mindoro Oriental).

Type Specimens. Holotype, allotype and 16 paratype specimens, labeled as follows: LUZON. LAGUNA: "Luzon, Paete [*printed*], VI.1916 [*handwritten*], G. Boettcher [*printed*]", holotype (1 ♂ ZMB), paratype (1 ♂ ZMB); *with additional label*: "Collection of Frederick Allen Eddy [*printed*]; borrowed ex MCZ [*printed*]", allotype (1 ♀ MCZ); *with additional label*: "Museum Leiden, collectie A.E. Kerkhoven [*printed*]", paratype (1 ♂ RMNH); *with additional label*: "Museum Leiden, Ex coll. B.H. Klynstra [*printed*]", paratype (1 ♂ RMNH); *with additional label*: "Field Mus. (F. Psota Coll.)", paratype (1 ♂ FMNH). "Paete, Luzon [*handwritten by W. Horn*]; Staudinger [*printed*], Boettcher [*handwritten by W. Horn*]; Coll. W. Horn, DEI Eberswalde [*printed*]", paratype (1 ♂ DEI). "Paete, Luzon [*handwritten by W. Horn*]; Coll. W. Horn, DEI Eberswalde [*printed*]", paratype (1 ♀ DEI). "Montalban, Schütze 1919 [*handwritten by W. Horn*]; Coll. W. Horn, DEI Eberswalde [*printed*]", paratypes (1 ♂ DEI). MINDORO: "Philippines, Mindoro, 27.VII.87, leg. R. Lumawig [*handwritten*]", paratypes (1 ♂ JWC); *same, but*: "VIII.87", paratype (1 ♂ FCC); *same, but*: "IX.87", paratypes (1 ♂, 1 ♀ JWC; 1 ♀ FCC). MINDORO ORIENTAL: "Philippinen [*printed*], Mindoro, Calapan [*handwritten*] (*on reverse*: S. Boettcher, II.1916 [*handwritten by W. Horn?*]", paratypes (3 ♂ ♂ ZMB; 1 ♂ FCC).

Remarks. The specimens from Mindoro appear to be slightly larger than those from Luzon, and moreover they have the discal spot of elytra placed slightly more behind the middle lateral spot (while these are placed nearly on the same transverse line in the specimens from Luzon). However, the shape of the male genitalia indicates to us that they are conspecific.

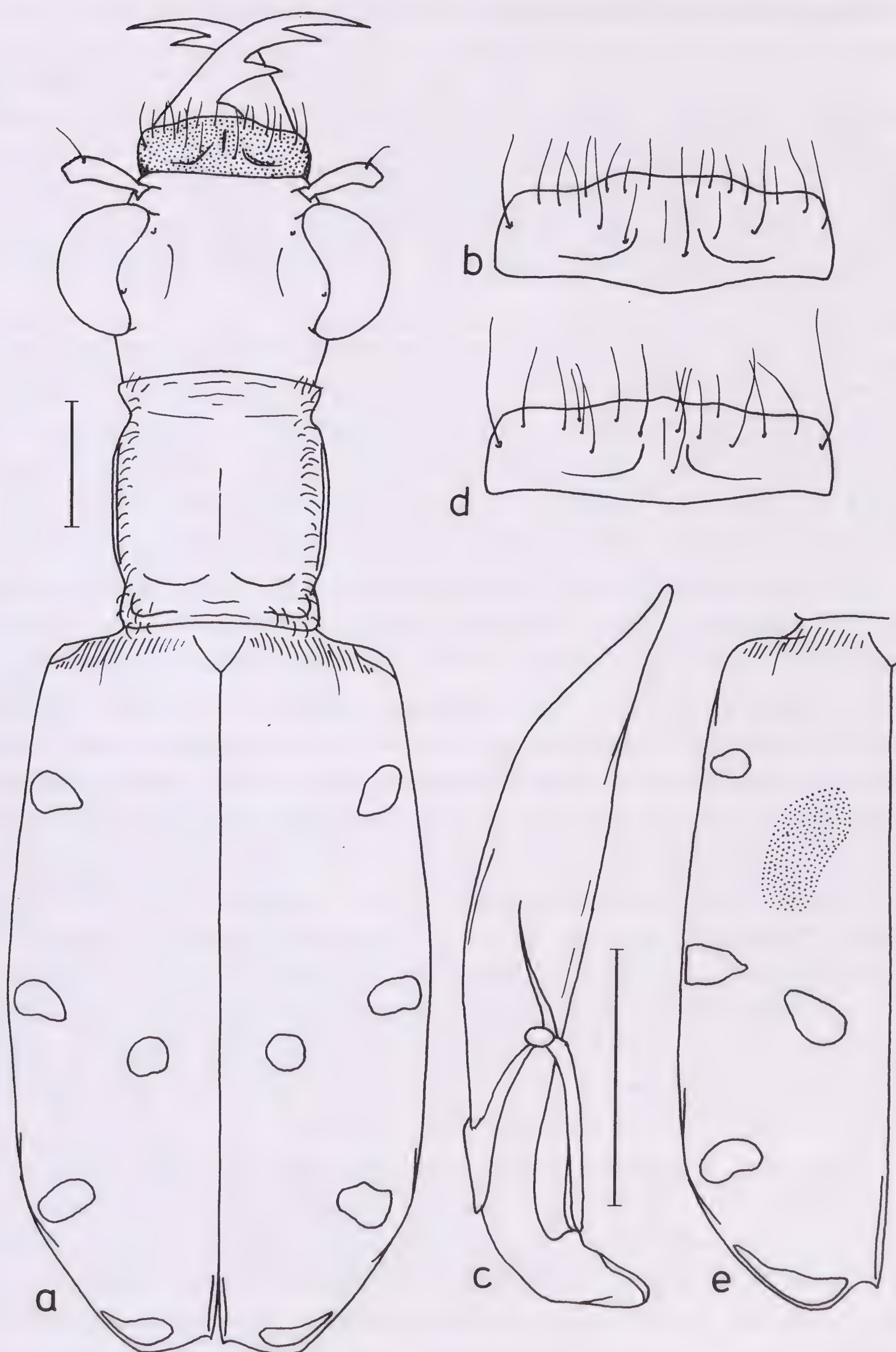


Fig. 9 - *Thopeutica (Thopeutica) luzona* n. sp. Holotype ♂ (CMNH): a. habitus, b. labrum, c. aedeagus; allotype ♀ (ZMB): d. labrum, e. left elytron. Scale-lines: 1 mm.

8. *Thopectica (Thopectica) luzona* n. sp. (fig. 9 a-e)

Diagnosis. Length: 9.3-10.2 mm (without labrum). Similar to *boettcheri*, but larger. Pronotum subrectangular-shaped, more elongate in male, slightly rounded at sides, pilose on lateral margins. Female mirror spot obliquely placed some distance from the suture. Sutural spine of elytral apex small but evident in both sexes. Aedeagus larger and longer than in *boettcheri*, tapering, with a straight, slightly button-ended apex.

Description. *Head* glabrous, strongly microsculptured above, dorsally blackish with cuprous to golden-green reflections on clypeus and genae; antennal plates metallic golden-green. Frons and vertex very finely striate, frons concentrically, vertex elliptically mesad; vertex laterally with deeper longitudinal striae; posteriorly, vertex transversely rugose, coarse transverse striae behind eyes and on genae.

Antennae reaching approximately half the elytral length; scape and antennomere 2 dark metallic green; antennomeres 3-4 bluish-black, nearly glabrous, 5 longer than 4, 5-11 dark brown to dull black.

Mouthparts. Labrum very short and transverse, about three and one half times wider than long, piceous to violaceous-black with most of surface embued with metallic bluish-green; teeth feebly produced anteriorly, the central tooth more or less effaced, each side with a deep depression near the posterior margin, 12-15 long submarginal setae and two to four discal setae mesally near the base. Mandibles long, slender, testaceous at base, tinged with metallic green in the middle and dark rufous apically (including the pre-apical incisors); 3rd preapical incisor short, blade-like, slightly obliquely truncate apically, wholly visible in front of labrum. Maxillary and labial palpi testaceous, with the last two palpomeres of the former and the last of the latter metallic green. Median tooth of mentum with two setae.

Prothorax. Pronotum subrectangular, slightly longer than wide (less elongate in the female), slightly rounded laterally, black with cuprous-green reflections on postero-lateral angles and in the transverse grooves; disc moderately convex, shallowly rugose, glabrous but setose laterally and at posterior lateral angles, anterior and posterior collars coarsely, transversely striate, posterior lateral angles weakly lobate. Propleura with long white setae (or punctures) over the whole sclerite except for a narrow band near the posterior groove, posterior

groove densely setose; prosternum clothed with decumbent setae, especially between procoxae. Venter light violaceous to cuprous-green in color.

Pterothorax. Mesepisterna mostly glabrous, smooth, golden- or bluish-green (male) to polished black (female); coupling sulcus consists of a deep hollow pit just above the middle of the mesepisternum, beneath the mesepimeral rim. Mesepisterna (ventral half), mesepimera, metepisterna densely clothed with recumbent white setae, mesosternum with a few lateral setae and a few between the mesocoxae, metasternum densely setose around the mesocoxae, metacoxae and opposite the pleuro-sternal suture.

Elytra broader than width of head across eyes, relatively long and wide, rounded at sides, dull greenish-black (except at extreme bases, where they are shiny metallic golden-green to violaceous). Female mirror spot rather large, shiny, metallic violaceous-black, obliquely placed some distance from the suture. Elytral maculation consisting of six small spots: humeral, sub-humeral, marginal, discal, sub-apical and apical (the latter comma-shaped along the posterior elytral border). Apex of elytra serrulate, evenly rounded, mesally oblique with sutural angle obtuse and tooth small but evident in both sexes. Epipleura dark rufous to dark metallic bronze.

Legs. Pro- and mesocoxae, as well as lateral margins of metacoxae, densely clothed with white recumbent setae; trochanters rufous to light brown, remainder of the legs metallic golden-green to violaceous.

Abdomen. Abdominal sterna bluish-green with golden to violaceous reflections, fully clothed with fine white recumbent pubescence; third visible sternum with one pair, fourth and fifth sterna with two to three pairs of longer, tactile setae at sides of middle near the posterior edge.

Aedeagus relatively large, long, tapering, with a straight, slightly button-shaped apex.

Etymology. This species is named after the island which incorporates its known distribution.

Distribution. Philippine Islands: Luzon I. (Nueva Vizcaya, Quezon).

Type Specimens. Holotype, allotype and 3 paratype specimens, labeled as follows: LUZON: "Luçon; Cicind. virginea Schaum [*handwritten*]; Nevins Coll. 1918-14 [*printed*]", paratype (1 ♂ BMNH). "Hist.-Coll. Nr. 42550, Luzon, Coll. Schaum [*handwritten*]", paratype (1 ♂ ZMB; abdomen destroyed

by parasites, aedeagus lacking!). NUEVA VIZCAYA: "Philippinen, Luzon [*printed*]; Imugan [*handwritten*]; (*on reverse*: S. Boettcher, 6.1916 [*handwritten*])", allotype (1 ♀ ZMB); *same, but*: "6.1917", paratype (1 ♀ ZMB). QUEZON: "Philippines, Quezon, Sierra Madre, 10-26 May 1978, A. Concepcion; Glaser Collection; 'Cicindela suavis?', det. W. D. Sumlin 1980", holotype (1 ♂ CMNH).

Remarks. Similar to, but larger than *fugax*. While males are easily separable because of the aedeagus shape, confusion amongst females is possible. However, *luzona* is larger, with smaller elytral mirror. The two species apparently occur sympatrically at Imugan, thus strengthening the statement of their specific separation.

9. *Thopectica (Thopectica) pseudoluzona* n. sp. (fig. 10 a-e)

Diagnosis. Length: 8.7-9.2 mm (without labrum). Similar to *luzona*, but smaller. Pronotum sub-rectangular in shape, slightly constricted in front, with anterior corners and postero-lateral angles densely setose. Female elytral mirror spot large, glossy black, broadly oval-shaped, with oblique orientation to the elytral suture. Sutural spine at elytral apex acuminate and pronounced in both sexes. Aedeagus shorter than in *luzona*, with the apex short and truncate, terminating in a short, blunt knob.

Description. *Head* glabrous, dense microsculpture of frons and vertex largely obscuring very fine concentric striae of frons and median looped striae of vertex; longitudinal striae entad of eyes and on genae somewhat coarser; behind eyes and on neck striae transverse, wavy. Head dull black, with cuprous to golden-green reflections on clypeus and genae; antennal plates metallic shiny cuprous to golden-green.

Antennae reaching approximately half the elytral length in male, shorter in female; scape and antennomere 2 metallic green; antennomeres 3-4 violaceous-black, nearly glabrous, 5 longer than 4, 5-11 dark brown to dull black.

Mouthparts. Labrum short and transverse, from three to three and one half times wider than long, metallic golden- to violaceous-green, each side with a deep depression near the posterior margin, 10-14 long submarginal setae and two to five discal setae mesally near the base; teeth feebly produced anteriorly, the central tooth small but evident. Mandibles long, slender, testaceous at base, tinged with metallic green in the middle, shiny piceous-black apically and on the pre-

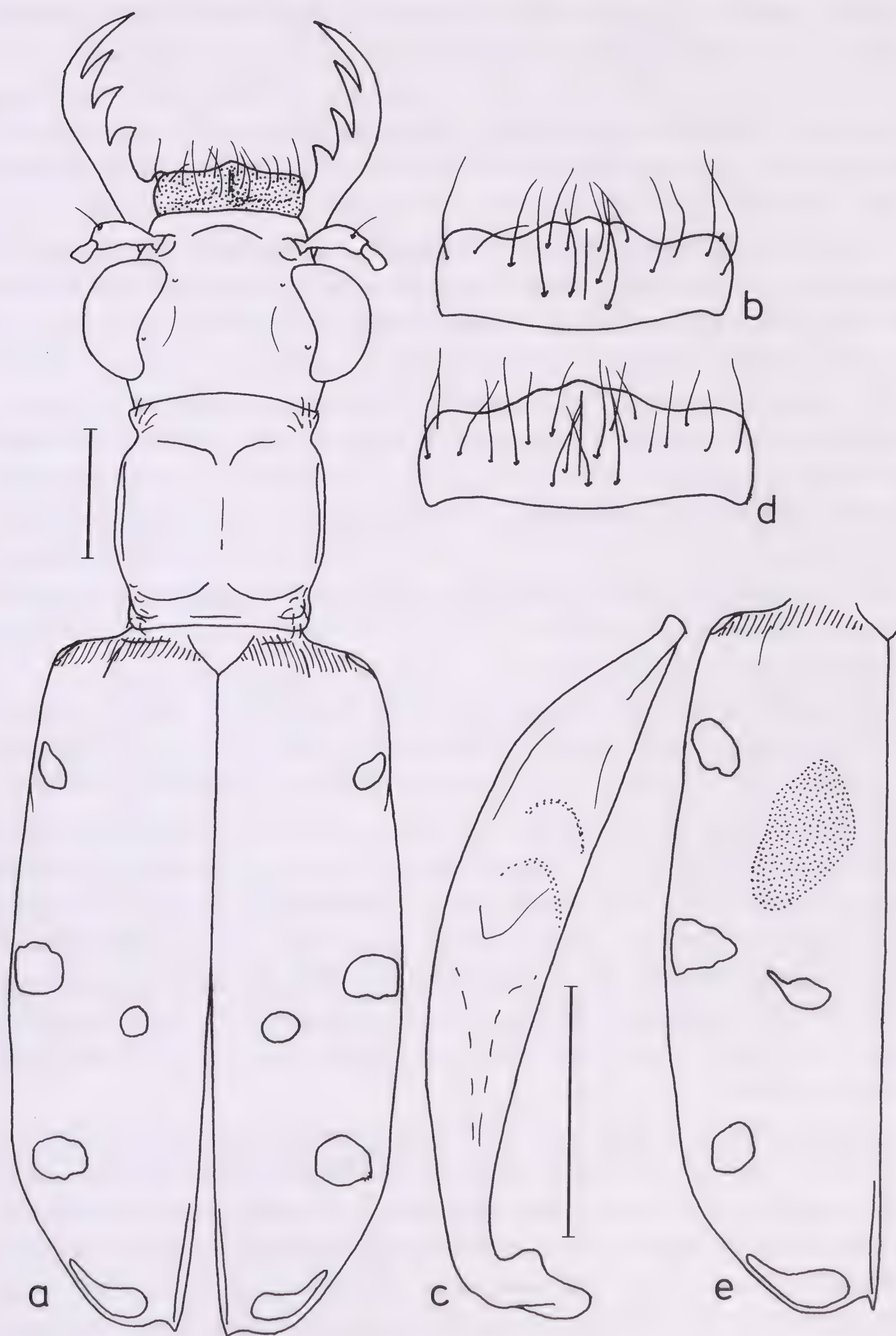


Fig. 10 - *Thopeutica (Thopeutica) pseudoluzona* n. sp. Holotype ♂: a. habitus, b. labrum, c. aedeagus; allotype ♀ (ZMB): d. labrum, e. left elytron. Scale-lines: 1 mm.

apical incisors; 1st preapical incisor closer to apical tooth than 2nd preapical tooth and is almost parallel with the latter; 3rd preapical incisor short, blade-like, obliquely truncate apically, wholly visible in front of labrum. Maxillary and labial palpi testaceous, with the last two palpomeres of the former and the last of the latter metallic blackish-green. Median tooth of mentum without setae.

Prothorax. Pronotum subrectangular, restricted in front, slightly longer than wide, rounded at sides, its maximum width just behind the middle; postero-lateral angles small, weakly protruding to obsolete; black with faint metallic hue on disc, on postero-lateral angles and in the transverse grooves. Pronotal disc moderately convex, shallowly rugose, with a small depression at the confluence of the middle longitudinal line with the posterior transverse groove; surface glabrous but lateral margins of anterior collar and postero-lateral angles setose, a few white setae (or pits) along lateral margins of disc. Propleura with long white setae over nearly the whole sclerite except for the dorsal edge, posterior groove densely setose; prosternum clothed with recumbent setae.

Pterothorax. Mesepisterna of male shallowly excavate (more strongly dorsally), with ventral half sparsely setose; surface black with a metallic luster. Mesepisternum of female glossy black with a metallic sheen; excavated from dorsal edge along anterior margin to ventral angle; dorso-medially with a broad rise and posteriorly with a coupling sulcus consisting of a deep pit tucked well beneath the humeral angle of the elytron and the dorso-ventral margin of the metepisternum. Mesepisterna (ventral part), mesepimera and metepisterna densely clothed with recumbent white setae, mesosternum with a few white setae on lateral sides and between the mesocoxae, metasternum densely setose.

Elytra broader than width of head across eyes, relatively long and wide, rounded at sides, dull black except at base and extreme suture and apex, where they are shiny metallic violaceous-black. Female mirror spot rather large, shiny, metallic violaceous-black, obliquely placed some distance from the suture. Elytral maculation typically six-spotted: humeral (small), sub-humeral (larger, rounded), marginal (subtriangular-shaped, more or less pointed inwards), discal (small, round to slightly transverse), sub-apical (large, rounded) and apical (comma-shaped along the posterior elytral border). Apex of

elytra microserrulate, evenly rounded; sutural tooth evident, strong, sharp in both sexes (more pronounced in female). Epipleura metallic violaceous-black.

Legs. Pro-, meso- and metacoxae densely clothed with white recumbent setae; trochanters rufous to piceous, remainder of the legs shiny metallic violaceous-black.

Abdomen. Abdominal sterna bluish-green with golden to violaceous reflections, fully clothed with fine white recumbent pubescence; third to fifth visible sterna with one to three pairs of longer, tactile setae at sides of middle near the posterior edge.

Aedeagus relatively large, long, tapering, almost straight on the ventral side, sub-parallel sided, with a short, straight, square, button-shaped apex.

Etymology. This species is named after its resemblance with *Th. luzona*.

Distribution. Philippine Islands: Luzon I. (Quezon).

Type Specimens. Holotype, ♂, allotype, ♀, and 10 paratype specimens (7 ♂♂, 3 ♀♀) labeled as follows: LUZON. QUEZON: "Luzon, Quezon, Sierra Madre, VII.1999, I.O. Lumawig". Holotype deposited in the SMNS collection, but presently as long term loan in JWC; allotype and six paratypes (5 ♂♂, 1 ♀) in JWC, 4 paratypes (2 ♂♂, 2 ♀♀) in FCC.

Remarks. Similar to, but smaller than *luzona*. While males are easily separable because of the aedeagus shape, confusion amongst females is possible. However, *luzona* is a little larger and is more heavily pilose at the lateral margins of the pronotum. Apparently both species sympatrically occur on the Sierra Madre, Quezon, thus strengthening the statement of their specific separation.

10. *Thopeutica (Thopeutica) negrosicola* n. sp. (fig. 11 a-e)

Diagnosis. Length: 8.5-9.4 mm (without labrum). Very similar to *boettcheri* and *darlingtonia*, however with more flattened elytra and a differently shaped male aedeagus. Pronotum sub-rectangular, slightly longer than wide, with a row of setae on lateral margins. Female elytral mirror spot rather large, black, oval-shaped, slightly pointed proximally, obliquely placed some distance from the suture. Sutural spine of elytral apex very small to absent in both sexes.

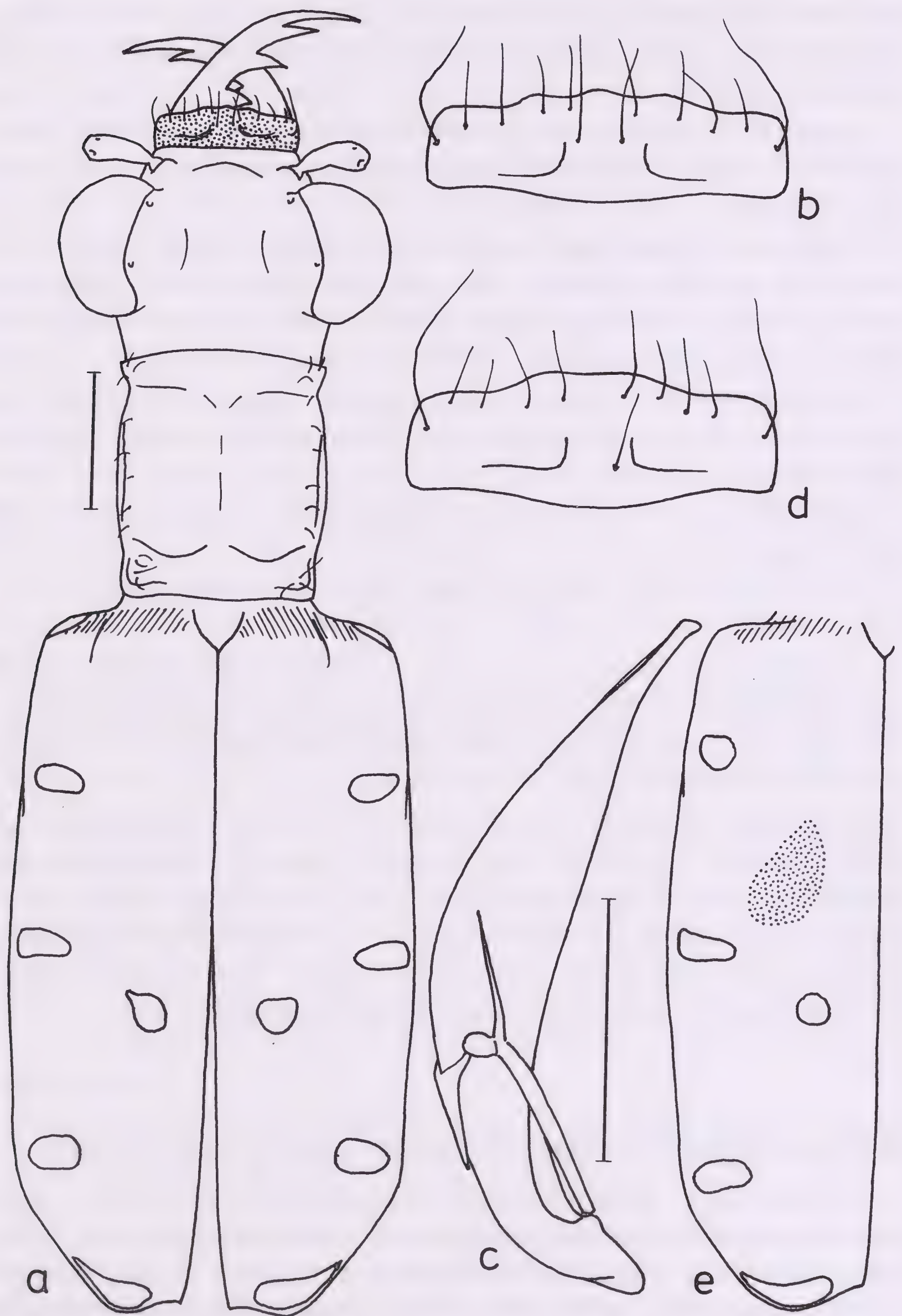


Fig. 11 - *Thopeutica (Thopeutica) negrosicola* n. sp. Holotype ♂ (CMNH): a. habitus, b. labrum, c. aedeagus; allotype ♀ (CMNH): d. labrum, e. left elytron. Scale-lines: 1 mm.

Description. *Head* glabrous, black with some roseate reflections above, clypeus and genae cuprous to golden-green, antennal plates metallic golden-green. Frons with very fine, rather indistinct transverse striae, vertex anteriorly with several elliptical striae, laterally paralleling longitudinal coarse striae entad of eyes, mesal rugosity obsolete, posteriorly, erose, faintly transverse to meandering; laterally behind eyes and on genae striae coarse, longitudinal and parallel.

Antennae nearly reaching half the elytral length; scape and antennomere 2 dark metallic green; antennomeres 3-4 bluish-black, nearly glabrous, 5 longer than 4, 5-11 dark rufous to blackish-brown.

Mouthparts. Labrum short, transverse, about three times wider than long, piceous to violaceous-black, more or less tinged with a metallic violaceous wash; feebly tridentate, the central tooth more or less effaced, median ridge weak, not carinate, lateral depressions shallow, each side with five to six submarginal setae and one or two additional discal setae toward the base. Mandibles slender, elongate, testaceous at base, tinged with metallic violet-green mesally and dark rufous on teeth and apically; apical tooth and 1st pre-apical incisor more closely juxtaposed than 1st is to 2nd, 1st pre-apical tooth considerably shorter than apical tooth, 3rd pre-apical incisor short, very broad at the base, acute, anterior edge convex and, at rest, partially obscured by labrum. Maxillary and labial palpi testaceous with the last two palpomeres of the former and the last of the latter metallic green.

Prothorax. Pronotum subrectangular, slightly longer than wide, subparallel-sided, black with some roseate to greenish reflections, postero-lateral angles lobate, more or less cuprous; disc glabrous, unevenly wrinkled in the middle, laterally with a row of setae from anterior to posterior margins; anterior collar coarsely rugose, posterior collar with a few transverse striae; median longitudinal line distinct with a number of short, shallow transverse setae mesally, remainder of disc with shallow, meandering grooves. Propleura cuprous-green, with long white setae (or setigerous punctures) over anterior half and ventrally, the posterior half nearly glabrous. Prosternum setose along pleuro-sternal sutures, medially glabrous.

Pterothorax. Mesopleuron shallowly excavate from anterior margin, across the mesopleural suture to metepisternum. Surface smooth, moderately microsculptured, metallic green. Postero-ventral corner of mesepisternum, mesepimeron and metepisternum with white recumbent setation. Mesosternum postero-laterally, metasternum

num anteriorly, laterally and around meso- and metacoxae punctate, densely setose. Metepisternum and thoracic sterna golden-green. Coupling sulcus: mesepisternum of female shallowly excavate anteriorly, raised beneath base of elytron, then deeply depressed along pleural suture to form a sulcus extending from near the elytral base to near the mesocoxal rim, in which lies a deep dorso-ventral pit adjacent to the pleural suture; glabrous except for a few recumbent setae along the postero-ventral corner; glossy black with a metallic tint.

Elytra significantly wider than head across eyes, relatively short, slightly convex postero-laterally, greenish-black overall with a coppery-violaceous metallic sheen at extreme base. Female mirror spot glossy black, large, oval-shaped, slightly pointed anteriorly, obliquely placed relative to the suture. Elytral maculation consisting of six small irregularly rounded dots: humeral, sub-humeral, marginal (subtriangular), discal, sub-apical and apical (the latter comma-shaped along the posterior elytral margin). Apex of elytra serrulate, laterally oblique, evenly rounded to an obtuse sutural angle, sutural tooth very small or obsolete (both sexes). Epipleura dark violaceous bronze (rufous in some specimens).

Legs. Pro- and mesocoxae, as well as the lateral margins of metacoxae, densely clothed with recumbent white setae; trochanters testaceous to rufous; remainder of the legs metallic greenish-bronze with cuprous to violaceous reflections.

Abdomen. Abdominal sterna golden- to cuprous-green, clothed with white recumbent pubescence, finer setae mesally and over terminal sternum; sterna 3-5 each with two pairs of tactile setae lateral of middle near the posterior margin.

Aedeagus fusiform, arcuate, with the apex stretched into a slender, straight, slightly button-ended beak.

Etymology. This species derives its name from Negros Island where it appears to be an endemic, meaning "inhabitant of Negros".

Distribution. Philippine Islands: Negros I. (Negros Occidental, Negros Oriental).

Type Specimens. Holotype, allotype and 7 paratype specimens, labeled as follows: NEGROS. NEGROS OCCIDENTAL: "Philippines: Negros Island, Mount Canla-on, July 1990", holotype (1 ♂ CMNH), allotype (1 ♀ CMNH), paratypes (1 ♂, 3 ♀♀ CMNH; 1 ♂, 1 ♀ FCC). NEGROS ORIENTAL: "Dumaguete, Negros or., May '49, Brues", paratype (1 ♀ MCZ). One additional, non-type, female specimen, labeled "Negros, Phil. Is.", in FCC.

Remarks. *Th. negrosicola* n. sp. is apparently a close relative of *boettcheri*, from Luzon and Mindoro, however it is clearly a separate species due to the different shape of the male aedeagus. Both at Mount Canla-on and near Dumaguete, Negros Island, it apparently occurs together with *Th. virginalis*, which belongs to the following group of species (stem 4).

11. *Thopeutica (Thopeutica) virginea* (Schaum) (fig. 12 a-e)

Cicindela virginea Schaum, 1860: 181 ["Insel Luçon"]. Schaum, 1863b: 66. Chaudoir, 1865: 21. W. Horn, 1893: 345; 1900: 216; 1901: 358; 1905: 33; 1915: 249, 283, 286; 1924b: 88; 1926: 164; 1929: 9; 1938: pl. 48 (fig. 22). Schultze, 1916: 8. Mandl, 1964: 90.

Cicindela virginia [sic!] (Schaum). Atkinson, 1889: 13.

Thopeutica virginea (Schaum). Fleutiaux, 1892: 132. Heyne, 1894: 30.

Cicindela virginica Schaum [probable misspelling of *virginea*]. W. Horn, 1931: 4.

Cylindera (Thopeutica) virginea (Schaum). Schilder, 1953: 547.

Diotophora virginea (Schaum). Rivalier, 1961: 137 (and fig. 7: elytron and aedeagus, possibly of *Th. interposita*?). Wiesner, 1980: 125.

Thopeutica (Thopeutica) virginea (Schaum). Cassola, 1991: 521. Wiesner, 1992b: 171. Lorenz, 1998: 51.

Type Specimens. *Th. virginea* was described from a single female specimen only ("Mas ignotus") which had been collected on Luzon by C.G. Semper (SCHAUM, 1860). This specimen is in the ZMB, with large yellow handwritten label "virginea/Schaum/Lucon" [handwritten by H.R. Schaum: see HORN & KAHLE 1935-37, pl. X, fig. 6]. It measures 9.2 mm; Schaum's measurement of the type was 9.52 mm ("4½ lin."), which suggests that he included the labrum. Our concept of the male is based on a comparison of general body characters with the female holotype.

Specimens examined. Seven specimens (including holotype).

Diagnosis. Length: 8.7-9.5 mm (without labrum). Head and pronotum rosy-bronze with blue-green to violet reflections. Pronotum subsquare, finely transversely striate, posterior angles small. Female without elytral mirror spot. Sutural spine of male short, tooth-like, moderately long in female. Venter metallic blue-green, rather densely setose. Aedeagus short, fusiform, tapering, with a pointed apex.

Redescription. *Head* dark bronze, vertex with slight roseate reflections, clypeus, antennal plates, margins of eyes and genae blue-green to violet. Frons with very fine concentric striae, vertex with fine

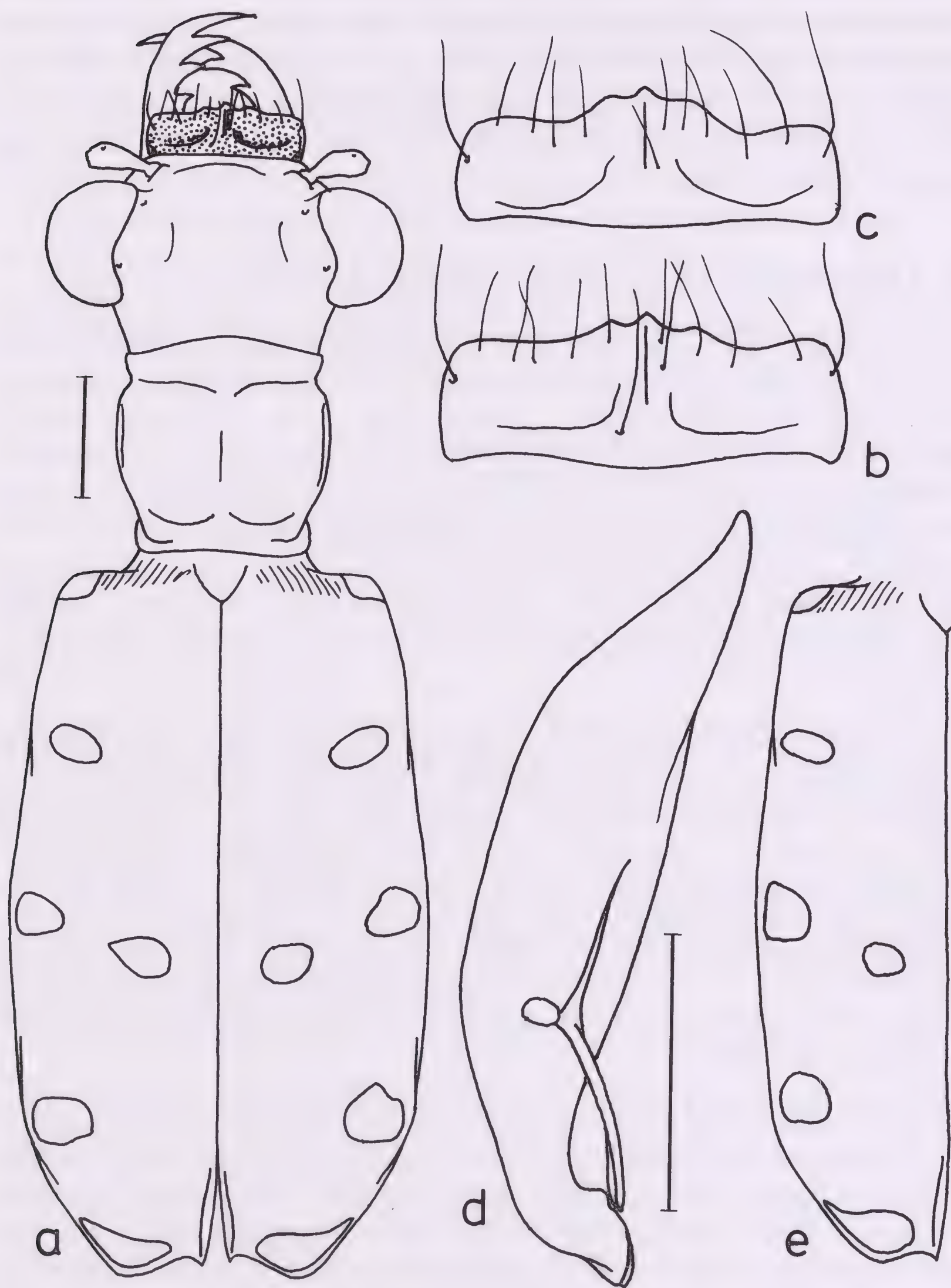


Fig. 12 - *Thopeutica (Thopeutica) virginea* (Schaum, 1860). Holotype ♀ (ZMB): a. habitus, b. labrum; ♂ from "Luzon" (DEI): c. labrum, d. aedeagus, e. left elytron. Scale-lines: 1 mm.

striae mesally, entad of eyes striae coarse, longitudinal; vertex behind eyes with rather erose, somewhat transverse wavy wrinkles, genae coarsely, longitudinally striate.

Antennae slender, not quite reaching half the elytral length; scape narrow, metallic golden-green; antennomere 2 golden-green, antennomeres 3-4 metallic violet, nearly glabrous, 5 longer than 4, 5-11 dark rufous.

Mouthparts. Labrum short and transverse, over three times wider than long, metallic bronze, with green to violet reflections; subcarinate anteriorly, each side with a lateral oval depression, anterior margin feebly tridentate with lateral teeth obtuse and median tooth sharp, well defined; five to seven submarginal and discal setae on each side. Mandibles elongate, with basal half testaceous, apical half (including teeth) rufous to bruneous, mesally tinged with a metallic green luster; 3rd pre-apical incisor acute. Maxillary and labial palpi testaceous, the apical palpomeres metallic brown-green.

Prothorax subsquare, moderately globose, slightly wider than long in the female, approximately as long as wide in male. Pronotum with feeble transverse striae over disc, coarser striae on anterior and posterior collars, postero-lateral angles reduced, median longitudinal line shallow; roseate or greenish bronze, with blue-green to violet reflections in anterior and posterior constrictions and on postero-lateral corners. Pronotum and prosternum glabrous, propleura with erect white setae near the anterior margin; surface smooth, dark bluish-bronze with violaceous reflections.

Pterothorax. Mesepisterna (females) mostly smooth, glossy violaceous-black; metallic golden-green (males) and with a few white setae ventrad; anterior dorso-ventral depression broad, flat; median ridge little developed, subsutural groove with a pit present in the female (coupling sulcus). Mesepimera, metepisterna, anterior and lateral sides of metasternum with recumbent white setae. Metepisterna and sternum metallic green with some bluish or golden reflections.

Elytra relatively short, wider than width of head across eyes, subparallel-sided, slightly rounded in female; dull, mostly matte black, with some slight velvety green shading. Female without elytral mirror spot. Elytral maculation typically six-spotted: humeral dot (present in both sexes), sub-humeral dot (slightly oblique), marginal dot (tending to subtriangular in shape), discal dot (obliquely placed behind

the marginal dot), subapical and apical dots (the latter one transverse, elongate, comma-shaped). Elytral apex serrulate, rounded, slightly retracted to an obtuse sutural angle; sutural spine of male short, tooth-like, moderately longer in female. Epipleura rufous to light bronze.

Legs. Pro- and mesocoxae, as well as the lateral margins of metacoxae, clothed with recumbent white setae; femora with curved setae along the ventral margin. Trochanters testaceous, femora metallic green at base, remainder of the legs metallic light greenish- to violaceous-bronze, lighter at "knees".

Abdomen. Abdominal sterna punctate-setose, clothed with white recumbent setae laterally, with sparse fine semi-erect setae mesally, metallic green to blue-green with golden reflections; sterna 3-5 each with two pairs of tactile submarginal setae.

Aedeagus short, fusiform, tapering, with a pointed apex.

Distribution. Philippine Islands: Luzon I. (Mountain Prov., Laguna, Quezon).

LOCALITY LABEL DATA. LUZON: "42461 [*printed*]; virginea Schaum, Lucon [*yellowish label, handwritten by H. Schaum*]", holotype (1 ♀ ZMB). "Luzon, Semper [*handwritten*]; Coll. W. Horn, DEI Eberswalde [*printed*]; virginea Schm. [*yellowish label, handwritten by W. Horn*]" (1 ♂ DEI). "Luzon, ex Heyne [*handwritten*]; Wickham Collection 1933 [*printed*]; Cicindela virginea Sch. [*red margins: handwritten by H. F. Wickham: cf. HORN & KAHLE 1935-37, 532 ('Rand rot') and pl. XII, fig. 35*]; Property USNM [*printed*]" (1 ♂ USNM). MOUNTAIN PROV.: "Mount. Prov., V.86" (1 ♀ KWC). LAGUNA: "Majayjay, Laguna, S. Luzon, 11.VI.1995, Ismael O. Lumawig" (1 ♂ JWC; 1 ♂ FCC). QUEZON: "Lucban, Tayabas, P.I., R.C. Mc Gregor [*printed*], V.26 [*handwritten*]; Cicindela pseudo-inter/posita W. H. [*handwritten by W. Horn*], Dr. W. Horn det., 1928 [*printed*]; Property USNM [*printed*]" (1 ♀ USNM).

Remarks. Our concept of the male is based on a comparison of general body characters with the female holotype. Size, head and pronotal sculpture, shape of postero-lateral angles of the pronotum, and elytral markings indicated that the most fitting male specimen is a small male in W. Horn's collection (DEI), also originated from the Semper material ("Luzon, Semper"), which bears a yellowish label "virginea/Schm." [apparently handwritten by W. Horn]. If our assumption that the male in the DEI collection represents the male of *virginea* is correct, this species fits into the present section by having a small, evenly fusiform, apically pointed aedeagus. The species figured by RIVALIER (1961, page 136, fig. 7) under "*Diotophora virginea* Schaum" which has a large, dorsally inflated, apically sharp-pointed aedeagus, is not

this species and most probably is *Th. pauper* (W.Horn) (see below). Male differs from female in that the antennae of the male are longer, attaining half the elytral length. Prothorax is narrower, approximately as long as wide. Only seven specimens in all have been found which fit our concept of *virginea*. The species strongly resembles *suavis*, however it is slightly larger, the pronotum is less distinctly rugose and shagreened, and the female coupling sulcus is a deep fovea just above (not below) the middle. Mensuration of the few available specimens indicates a range of lengths of 8.2-9.5 mm (without labrum).

12. *Thopeutica (Thopeutica) davaoensis* n. sp. (fig. 13 a-c)

Diagnosis. Length: 11.5 mm. Apparently a species of the *virginea*-group, medium-sized, with elytra very large and long in proportion with head and pronotum. Pronotum slightly wider than long, laterally convex behind the anterior collar; postero-lateral angles lobate; disc violaceous-black mesally, laterally green; anterior and posterior collars entirely metallic golden-green. Elytral mirror spot glossy bronze, rounded, with ill-defined edges and well removed from the suture; elytral sutural spine very small. Male unknown.

Description. *Head* glabrous, dull black with roseate to violaceous highlights, margins of eyes tinged with metallic green; bluish-green on clypeus, antennal plates and genae (up to the posterior angle of eyes). Frons with fine, strongly concentric striation; vertex mesally with a few looped striae anteriorly and transverse shallow striae posteriorly; vertex laterally (including orbital plates) with strong, coarse longitudinal striae; behind eyes, a few deep transverse parallel setae extend to the gula; genae with deep, parallel striae.

Antennae attaining about the first half of elytral length; scape metallic golden green; antennomeres 2-4 metallic bluish-black, nearly glabrous, 5 longer than 4, 5-11 dark rufous to blackish-brown.

Mouthparts. Labrum short and transverse, about three and one half times wider than long, basal half metallic green, anteriorly piceous; subcarinate, each side with a large transverse depression, anterior margin distinctly tridentate with the central tooth subequal to the lateral pair; eight evenly spaced long, submarginal setae near the anterior edge. Mandibles moderately long, broad, dorsally flattened, testaceous

at base, tinged with metallic dark violet-green in the middle, teeth rufous-brown; apical tooth and 1st pre-apical incisor slender, 2nd and 3rd pre-apical incisors triangular, broad at the base, 3rd pre-apical incisor with a basal notch on the anterior margin, projects postero-mesally, mostly obscured by the labrum. Maxillary and labial palpi testaceous, with the terminal palpomere metallic green, the penultimate of the former also partially darkened.

Prothorax mostly glabrous, setation restricted to a few decumbent white setae (or punctures) on the propleuron near the sterno-pleural suture. Pronotum laterally convex, slightly wider than long, constricted anteriorly; pronotal disc dorsally convex, longitudinal median line nearly effaced, sculptured with scattered and very shallow meandering to transverse wrinkles. Anterior and posterior collars strongly developed, constrictions deep; anterior collar with two distinct transverse grooves across the midpoint, posterior collar with a short transverse groove at each side of the midpoint; postero-lateral angles lobate. Pronotal disc dull violaceous-black mesally, green laterally; entire anterior and posterior collars, as well as constrictions and postero-lateral lobes, metallic golden-green. Propleura and sternum bluish-green.

Pterothorax. Mesepisterna with a broad, shallow curved depression that parallels the anterior margin for its entire length. A ridge, arising at the base of the elytra, parallels the depression until it fades out below the midpoint of the mesepisternum (the dorsal end of this ridge has a small pit anterior to it); posterior to the ridge, and arising at the base of the elytron, is a long, narrow coupling sulcus in which there is a deep, longitudinal pit; this sulcus diverges from the pleural suture. Mesepisternal surface glabrous; anterior and dorsal to sulcus, glossy black; posterior and ventral to sulcus, metallic green. Mesepimera, postero-lateral corners of the meso- and meta-sterna clothed with decumbent white setae.

Elytra proportionally very large and long (relative to the head and prothorax), significantly wider than width of head across eyes, subparallel-sided, slightly convex laterally; dull black except at extreme base (from scutellum to humeral angles) where they are metallic golden-green with some cuprous reflections. Female elytral mirror spot bronze, roundish, with poorly defined margins, well removed from the suture. Maculation consists of the ordinary six

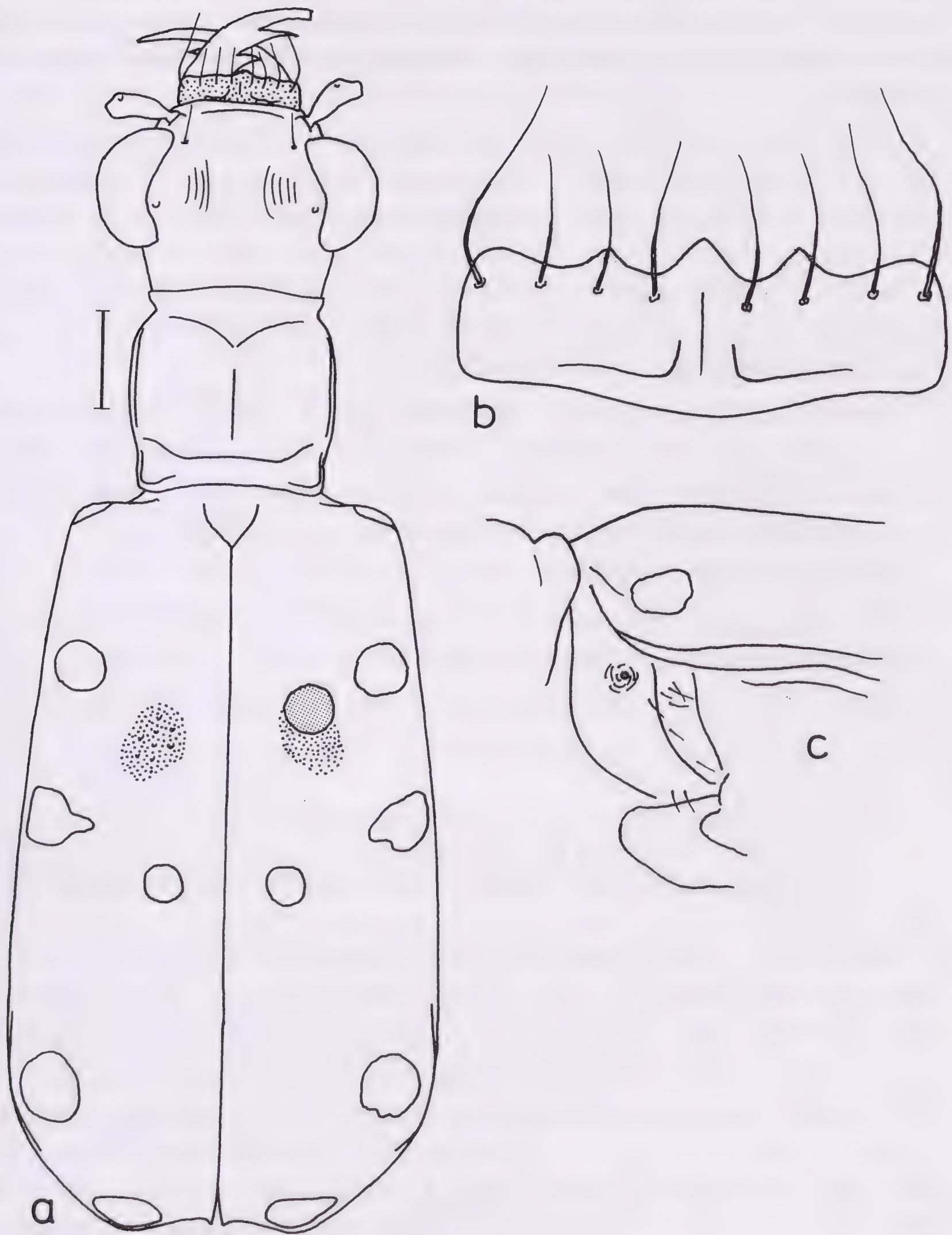


Fig. 13 - *Thopeutica (Thopeutica) davaoensis* n. sp. Holotype ♀ (CMNH): a. habitus, b. labrum, c. coupling sulcus. Scale-line: 1 mm.

small roundish spots: humeral (small), sub-humeral (larger), marginal (subtransverse, pointed inwards), discal (very small), sub-apical (same size as sub-humeral) and apical (small, transverse). Apex of elytra evenly rounded, finely serrulate, sutural spine very small. Epipleura dark rufous.

Legs. Pro- and mesocoxae externally with scattered setae; lateral edges of metacoxae, clothed with recumbent white setae. Trochanters bare, dark testaceous, with a single seta on tip of fore- and middle ones; femora dark bronze, tinged with metallic green in basal parts; tibiae testaceous-rufous, partially tinged with some metallic luster, darkened apically; tarsi also partially rufous at bases, darkened into dark greenish bronze on terminal segments.

Abdomen. Sterna bluish- to golden-green. First two abdominal sterna mostly glabrous (few minute setae mesad), distal sterna more or less clothed with fine recumbent white pubescence; third visible sternum with one pair of tactile setae, two pairs on fifth.

Aedeagus. Male unknown.

Etymology. The species is named after the locality of its capture, Davao province of Mindanao Island.

Distribution. Philippine Islands: Mindanao I. (Davao del Sur).

Type Specimen. Holotype, ♀, from MINDANAO (DAVAO DEL SUR), labeled as follows: "Philippine Is., Lake Bimado, Mt. Apo, Davao, 14 June 1976, E. Schoenig", in CMNH collection. Abdomen of the holotype damaged by a dermestid.

Remarks. *Th. davaoensis* n. sp. possesses a number of remarkable characters absent in other Philippine *Thopectica*. These include the proportionately small head and thorax, mandibles with notched 3rd preapical incisor, striking coloration of the anterior and posterior collars of the pronotum, structure of the mesepisternum and coupling sulcus. It remains to be seen if these hold up with the discovery of additional specimens. Despite the fact that the male is unknown, this species is clearly characterized by the relatively small head and prothorax in relation to the relatively larger posterior body and wide elytra. Shape and coloration of pronotum are also diagnostic. Hopefully, the discovery of male specimens in the future will help to determine the taxonomic placement for this very distinctive species.

STEM 4

Moderately small beetles (8.2-9.6 mm without labrum). Mandibles with basal half (to or beyond third pre-apical incisor) testaceous; left mandible with 3rd pre-apical incisor obtusely truncate. Elytra more or less evenly granulate punctate from base to apex. Aedeagus slender, narrow and long, apex elongate and rounded or with slight dorsal hook.

KEY TO SPECIES OF STEM 4

- 1a. Prosternum broadly setose along lateral margins. Elytra with foveolate punctures distinctly metallic green; sutural spines small, short. Male aedeagal apex rounded; female with elytral mirror spot *fugax*
- 1b. Prosternum glabrous. Elytra with non-foveolate, fine granulate-punctures of same colour as surrounding surface; sutural spines acuminate, long. Male aedeagal apex with small dorsally directed hook; females with or without elytral mirror spot 2
- 2a. Pronotum with band of white recumbent setae along entire lateral margins *virginalis*
- 2b. Pronotum with white recumbent setae restricted to anterolateral corners *pseudointerposita*

13. *Thopeutica (Thopeutica) fugax* (Schaum) (fig. 14 a-d)

Cicindela fugax Schaum, 1862: 177 ["Luzon, ♂ ♀"]. Schaum, 1863b: 66. Atkinson, 1889: 8. W. Horn, 1905: 32-33; 1908: 40; 1915: 280, 283-284; 1926: 163; 1929: 8; 1938: pl. 47 (fig.22). Schultze, 1916: 7. Mandl, 1964: 90.

Thopeutica stenodera fugax (Schaum). Fleutiaux, 1892: 132. Heyne, 1894: 30.

Cylindera (Thopeutica) fugax (Schaum). Schilder, 1953: 547.

Diotophora fugax (Schaum). Rivalier, 1961: 137 (fig. 7). Wiesner, 1980: 125.

Thopeutica (Thopeutica) fugax (Schaum). Cassola, 1991: 521. Wiesner, 1992b: 171. Lorenz, 1998: 51.

Type Specimens. SCHAUM (1862) apparently described *C. fugax* from three specimens. Two male specimens attributed to Semper are in Schaum's collection (ZMB). The one with a large yellow handwritten determination label with a black border is herein designated to be the species' lectotype; additional labels include "39946/fugax Schaum/Luzon, Semper/ Zool. Mus./ Berlin". The second specimen in the series becomes a paralectotype and has a small white

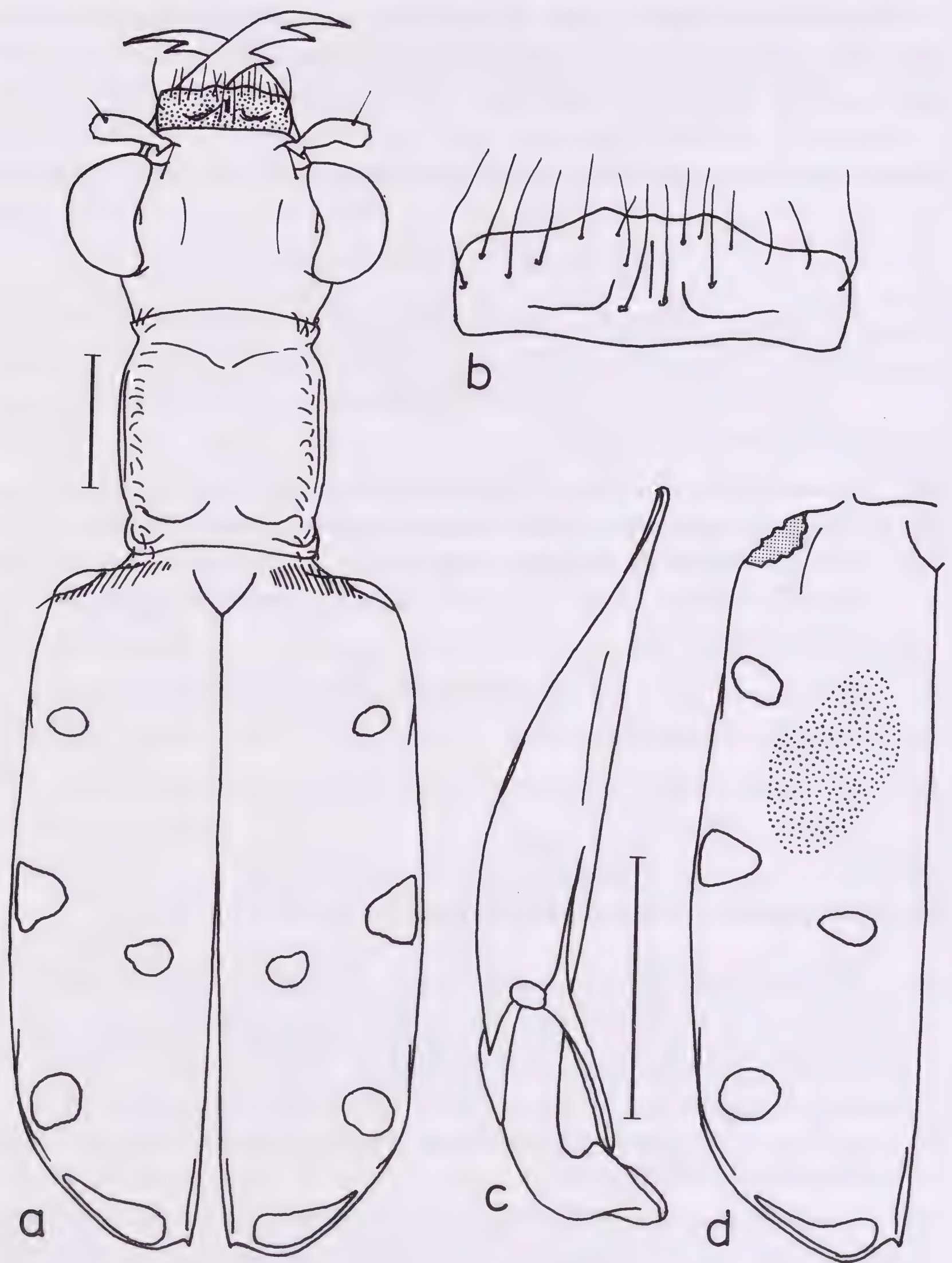


Fig. 14 - *Thopeutica (Thopeutica) fugax* (Schaum, 1862). Lectotype ♂ (ZMB): a. habitus, b. labrum, c. aedeagus; paralectotype ♀ (ZMB): d. left elytron. Scale-lines: 1 mm.

label: "Hist.-Coll./nr. 39946/Luzon, Semper"; this specimen is missing three legs and the antennae. A third specimen, and probably the female specimen available to Schaum, is labeled "42550"; this also is designated a paralectotype; this specimen has the eyes and a large part of the head badly damaged by dermestids (*Anthrenus*). Lectotype and paralectotypes have been appropriately labeled.

Specimens examined. Forty specimens (including lectotype and two paralectotypes).

Diagnosis. Length: 8.5-9.5 mm (without labrum). Head and pronotum dark gray-green to dark bronze with very slight roseate reflections. Pronotum subrectangular, parallel-sided, elongate, laterally with a band of white recumbent setae. Elytra laterally slightly convex (male), more convex in female. Females with a large, glossy black, oval-shaped, mirror spot. Sutural spine short but evident in both sexes. Male with aedeagus slender, tapering, with a long, narrow, rounded apex.

Redescription. *Head* dark bronze with very slight roseate reflections; clypeus, antennal plates, and genae cuprous-green to metallic green. Frons and vertex with very fine sculpture (subconcentric on frons); deep longitudinal striae entad of eyes, fine wavy wrinkles behind eyes on neck; genae longitudinally striate; antennal plates smooth.

Antennae slender, nearly reaching half the elytral length in male (shorter in female); scape metallic green; antennomeres 2-4 metallic violet, nearly glabrous, 5 longer than 4, 5-11 dark rufous-brown.

Mouthparts. Labrum short and transverse, over three times wider than long, subcarinate, each side with lateral depressions, metallic bronze, rufous to black with faint to strong metallic green colour; male with anterior margin irregular, medially concave and with antero-lateral corners broadly rounded; female, feebly tridentate with lateral teeth (less often median tooth) obtuse or nearly obsolete, antero-lateral corners more angular. Setation of labrum consisting of five to seven submarginal setae on each side, one pair of setae removed from the edge straddling the median ridge and usually one centrally placed posterior seta. Mandibles elongate, testaceous at base, rufous in the front part and on teeth, tinged with metallic green in the middle; pre-apical incisor obliquely truncate. Maxillary and labial palpi testaceous, with the distal palpomere of the latter and terminal two palpomeres of the former dark metallic green.

Prothorax. Pronotum subrectangular, parallel-sided, slightly elongate, dark blackish-bronze with very slight roseate sheen; disc nearly flat with rugulose sculpture, glabrous, lateral margins with a band of white recumbent setae, anterior and posterior constrictions and lateral margins of postero-lateral angles metallic green. Propleura clothed over most of surface with white decumbent setae, dark bronze with roseate to cuprous reflections. Prosternum broadly setose along lateral margins.

Pterothorax. Mesepisterna mostly smooth, metallic green to polished black with violet reflections, narrowly setose near the mesepimeral rim. Coupling sulcus consisting of a shallow, anterior dorso-ventral depression and ridge separating it from a dorso-ventral groove with a pit under the elytral base. Mesepimera, metepisterna, and anterior and lateral margins of the metasternum clothed with recumbent white setae. Metepisterna and sterna metallic green with some bluish or golden reflections.

Elytra. Elytra relatively short, wider than width of head across eyes, subparallel-sided, slightly rounded in female. Base of elytra, scutellum and humeral angles shiny black to metallic green or bronze; colour of disc (without magnification) matte greenish-gray. Female elytral mirror spot large, glossy black, oval-shaped, obliquely divergent from the suture. Elytral maculation typically six-spotted: humeral dot (present in both sexes), sub-humeral dot (rounded in most specimens), marginal dot (subtriangular in shape), discal dot (obliquely placed behind the marginal dot), sub-apical and apical dots (the latter one transverse, elongate, comma-shaped, sometimes nearly reaching the subapical dot). Apex of elytra evenly rounded, slightly retracted; sutural spine small but evident in both sexes. Epipleura rufous to dark bronze.

Legs. Anterior side of pro- and mesocoxae, and side margins of metacoxae with recumbent white setae; femora, with curved setae along ventral margin. Trochanters dark testaceous, femora narrowly metallic green at base, remainder of legs metallic dark bronze with violaceous reflections.

Abdomen. Abdominal sterna punctato-setose, clothed with recumbent white setae except for the middle of sterna 6 and 7 which are less densely clothed with finer semi-erect setae. Visible sterna 3-5 each with two pairs of tactile setae. Venter metallic green to blue-green with golden reflections.

Aedeagus slender, tapering, subparallel-sided, its maximum width at the middle, ending into a long, narrow, straight apex.

Distribution. Philippine Islands: Luzon I. (Mountain Pr., Nueva Vizcaya, Benguet, Bataan, Laguna).

LOCALITY LABEL DATA. PHILIPPINES: "Philippinen, Meyer [*handwritten by W. Horn?*]" (1 ♂ DEI). "Harris Collection [*printed*], Philipp. Is. [*handwritten*], Determ'd by W. Horn, Chas. Fuchs Coll. n. 109 [*printed*]" (1 ♀ MCZ). "42550", paralectotype (1 ♀ ZMB). "Philippines [*handwritten*], Coll. Geittner [*printed*]; *Cicindela stenodera* Schaum [*handwritten*], det. Csiki [*printed*]" (1 ♂ FCC). "Phil. Isl." (1 ♀ BMNH). **LUZON:** "39946 [*printed*]; *fugax* Schaum, Luzon, Semper [*large yellow rectangular label, handwritten*]", lectotype (1 ♂ ZMB). "Hist.-Coll. Nr. 39946, Luzon, Semper [*handwritten*]", paralectotype (1 ♂ ZMB). "Luçon [*handwritten*]" (1 ♀ DEI). "Harris Collection [*printed*], Luzon, Phil. Is. [*handwritten*], Staudinger & Bang Haas [*printed*]" (1 ♂ MCZ). "Luçon [*handwritten by W. Horn?*]; Coll. Baden Ruge [*handwritten*]; Coll. W. Horn, DEI Eberswalde [*printed*]" (2 ♂♂, 1 ♀ DEI). "Luçon [*handwritten by W. Horn?*]; Coll. Baden Ruge [*handwritten*]; *C. fugax* Schm. [*handwritten by W. Horn*], Dr. W. Horn det. 1923 [*printed*]; Museum Leiden, Ex coll. B.H. Klynstra [*printed*]" (1 ♀ RMNH). "N.Luzon, Whitehead [*handwritten*]; *fugax* Schm., t. Horn [*handwritten*]; F. Bates Coll., 1911-248 [*printed*]" (1 ♀ BMNH). **MOUNTAIN PROV.:** "Philippines: N.Luzon, Mt. Province, 27.V.1986, leg. R.M. Lumawig" (2 ♂♂, 3 ♀♀ JWC; 1 ♂, 1 ♀ FCC). "Mount. Prov., VI.86, Philipp." (1 ♀ FCC). "N-Luzon, Mount. Province, VII.86" (2 ♂♂, 2 ♀♀ KWC). "Payambugan, Mt. Prov., P.I., VII.9.31 [*printed*]; F.C. Hidden Collection [*printed*]; ex coll. C. v. Nidek [*printed*]; *Cic. fugax* Schaum, det. C. van Nidek 1954" (1 ♀ ITZ). **NUEVA VIZCAYA:** "Philippinen, Luzon [*printed*], Imugan [*handwritten*] (*on reverse*: S. Boettcher VI.1917 [*handwritten*])" (2 ♀♀ ZMB; 1 ♀ FCC); *with additional label*: Field Mus. (F. Psota Coll.) [*printed*]" (1 ♀ FMNH); *with additional label*: Collection Frederick Allen Eddy [*printed*]" (1 ♂ MCZ); *with additional label*: H.C. Fall Collection [*printed*]" (1 ♂ MCZ); *with additional label*: *fugax* Schm., acq. Staudinger [*handwritten*]; Museum Leiden, Ex coll. B.H. Klynstra [*printed*]" (1 ♂ RMNH); *with additional label*: Museum Leiden, collectie A.E. Kerkhoven" (1 ♀ RMNH). "Philippinen, Luzon [*printed*], Imugan [*handwritten*], Calder Collection [*printed*]" (1 ♀ CMNH). **BENGUET:** "Baguio, Benguet, Baker [*printed*]" (1 ♂ DEI; abdomen and aedeagus lacking!). **BATAAN:** "Lamao, Bataan, 4.8.07, Schultze [*handwritten*]; Collected by W. Schultze [*printed*]; Acc. No. 7836, Lot Bu. of Sci., P.I. [*printed*]; Coll. W. Horn, DEI Eberswalde [*printed*]; *fugax* Schm. [*yellowish label, handwritten by W. Horn*]" (1 ♂ DEI). **LAGUNA:** "Mt. Makiling, Luzon, Baker [*printed*]; *Cicindela fugax* Schm. [*handwritten by W. Horn*], Dr. W. Horn det. 1928 [*printed*]; Property USNM [*printed*]" (1 ♂ USNM). "Luzon, Paete, VI.1914, G. Boettcher, Calder Collection [*printed*]" (1 ♂ UMIC).

Remarks. Apparently *fugax* and *luzona* occur sympatrically at Imugan at least, thus strengthening the statement of their specific separation. The two species are very similar to each other and, while males are easily separable because of the aedeagus shape, confusion amongst females is always possible. However, *fugax* is smaller, with a proportionately larger elytral mirror.

There is a record of *fugax* also from Mindanao, Surigao (HORN, 1923), but such a record appears to be doubtful and probably due to mislabeling. Therefore, it was not considered in the distribution given above.

14. *Thopectica (Thopectica) virginalis* (W. Horn) (fig. 15 a-d)

Cicindela virginalis W. Horn, 1901: 358 ["Luzon (Semper)"]. W. Horn, 1905: 33; 1915: 283-286; 1923: 363; 1926: 164; 1929: 9; 1931: 4; 1938: pl. 48, fig. 26. Döbler, 1973: 417.

Cylindera (Thopectica) virginalis (W. Horn). Schilder, 1953: 547.

Diotophora virginalis (W. Horn). Rivalier, 1961: 137. Wiesner, 1980: 125.

Thopectica (Thopectica) virginalis (W. Horn). Cassola, 1991: 522. Wiesner, 1992b: 171. Lorenz, 1998: 51.

Type Specimens. Holotype, ♀, labeled: "Luzon, Semper; Type! Dr. W. Horn; Syntypus [red, printed label]; virginalis mihi" [yellowish rectangular label handwritten by W. Horn], in DEI (DÖBLER, 1973). Two specimens (male and female) in RNC and one male specimen in KWC, also from Luzon (Mountain Province), compared to the holotype and found to be nearly identical and within our concept of species variability, have provided probable males of this species.

Specimens examined. One hundred and three specimens (including holotype).

Diagnosis. Length: 8.2-9.5 mm (without labrum and sutural spine). Pronotum subsquare, approximately as wide as long, with band of white recumbent setae laterally. Elytra elongate, dull velvety grayish-black suffused with olive-green; female mirror spot variable. Sutural spine long and acuminate in both sexes. Aedeagus long and slender, weakly amplified after middle, terminated in a short, narrow, but relatively straight apex which is slightly hooked on the dorsal face.

Redescription. *Head* dark bronze with a cuprous luster and more or less strong metallic blue-green reflections on clypeus, frons, vertex and genae. Frons with fine, rather indistinct concentric striae; vertex with coarse longitudinal striae entad of eyes, mesally finer and shallower; posteriorly with indistinct meandering striae; genae and sides of neck more deeply and coarsely striate.

Antennae slender, attaining less than half the elytral length; scape metallic green; antennomeres 2.-4. metallic violet with bluish annuli distally, nearly glabrous, 5 longer than 4, 5-11 dark rufous-brown to black.

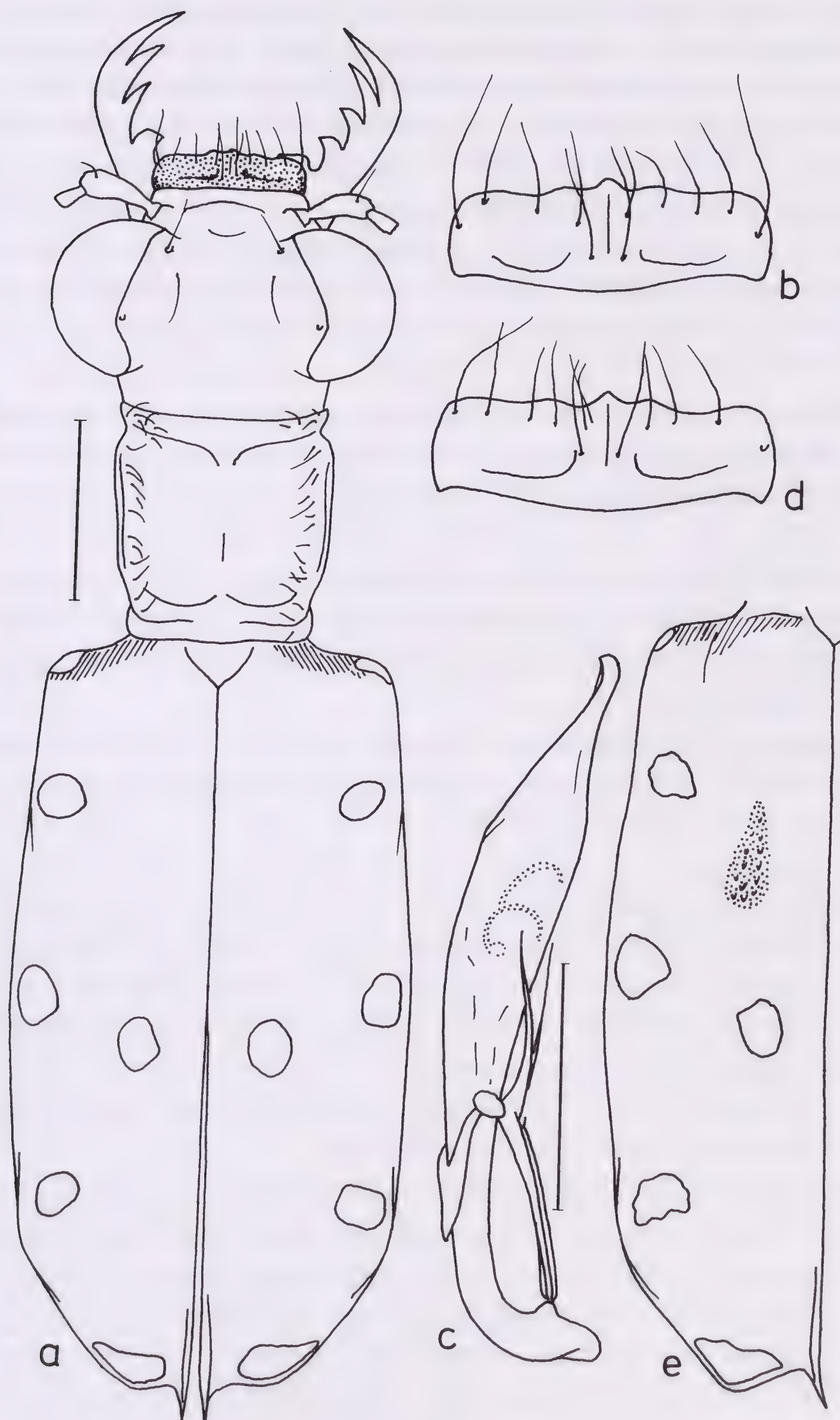


Fig. 15 - *Thopeutica* (*Thopeutica*) *virginalis* (W. Horn, 1901). ♂ from "Negros Island, Mt. Canlaon" (FCC): a. habitus, b. labrum, c. aedeagus; ♀ as above (FCC): d. left elytron. Scale-lines: 1 mm.

Mouthparts. Labrum short and transverse, over three times wider than long, mesally subcarinate with lateral depressions, metallic bronze-green with violaceous reflections anteriorly; each side with four to six long, submarginal setae and one pair of setae posteriorly set astride the median carina; anterior margin with small median tooth, lateral teeth obsolete. Mandibles elongate, testaceous at base, rufous at apex and on teeth, with a green metallic luster mesally; 3rd pre-apical incisor obtusely truncate. Maxillary and labial palpi testaceous except terminal palpomeres metallic green (penultimate maxillary palpomere with metallic luster in female holotype).

Prothorax. Pronotum subquadrate, approximately as wide as long, rounded at sides; disc moderately convex, finely and irregularly wrinkled; lateral margins with band of white recumbent setae; colour dark bronze with a cuprous luster on disc and strong metallic blue-green reflections on anterior and posterior constrictions and on the postero-lateral angles. Propleuron smooth, dark bronze with green or violaceous metallic reflections; sparsely setose over ventral half; prosternum glabrous.

Pterothorax. Mesepisterna smooth, evenly concave across width with recumbent setae postero-ventrally, metallic green to glossy black with violaceous reflections, ventrally with a few white setae. Coupling sulcus consisting of a shallow anterior, dorso-ventral channel (originating from the juxtaposition of the pronotum and elytral base) and flaring out past mid-mesepisternum, and a second, deep depression which parallels the posterior margin of the mesepisternum with its deepest part just beneath the humeral base. Mesepimera, metepisterna and sides of mesosternum clothed with recumbent, white setae. Metasternum laterally setose. Sterna and pleural sternites metallic golden-green with some cupric or bluish reflections.

Elytra narrow, elongate, laterally uneven, slightly wider than width of head across eyes, dull velvety grayish-black suffused with olive-green overtones; base between scutellum and humeral angles shiny blue-green to black. Female elytral mirror spot variable, ranging from a barely discernable metallic dot to a glossy black, oblique oval with a granulate-punctate surface. Elytral maculation typically six-spotted, dots rounded, relatively large: humeral dot (present in both sexes), sub-humeral dot (slightly oblique in some specimens), marginal dot (obliquely tending to subtriangular), discal dot (only slightly obliquely

placed behind the marginal dot), sub-apical and apical dots (the latter one larger, transverse, comma-shaped). Apex of elytra rounded in male, more angular, obliquely sub-truncate in female; sutural spine of elytra long, acuminate in both sexes, spines may overlap in female when elytra are closed. Epipleura rufous to dark metallic bronze.

Legs. Anterior side of pro- and mesocoxae, and lateral margins of metacoxae with recumbent white setae, femora with curved white setae along the ventral margins. Trochanters rufous, femora metallic bluish-green on basal half, remainder of legs metallic dark bronze with violaceous reflections.

Abdomen. Visible abdominal sterna 1-2 with narrow to broad lateral bands of setae, 3-5 fully clothed with recumbent white setae, sterna each with two pairs of tactile setae; golden-green with bluish reflections.

Aedeagus long and slender, weakly swollen distad of middle, ending in a narrow, straight, short apex, slightly hooked on the dorsal side.

Distribution. Philippine Islands: Luzon I. (Mountain Pr.); Marinduque I.; Masbate I.; Panay I. (Antique); Negros I. (Negros Occidental, Negros Oriental); Leyte I. (Southern Leyte); Bohol I.; Mindanao I. (Agusan del Norte, Davao Oriental).

LOCALITY LABEL DATA. LUZON: "Luzon, Semper [*handwritten by W. Horn*]; Type! Dr. W. Horn [*printed*]; Holotypus [*red printed label*]; virginalis mihi [*yellowish rectangular label, handwritten by W. Horn*]", holotype (1 ♀ DEI). MOUNTAIN PROV.: "Luzon, Mountain pr., IV.1987, Dufour leg." (1 ♂, 1 ♀ RNC). "Mount. Pr., Philip., 5.86; Diotophora virginea Schaum, det. K. Werner 1988" (1 ♂ RNC). "N-Luzon, Mountain Province, 7.86" (1 ♂ KWC). MARINDUQUE: "Marinduque, IX.84, Lumawig, 'Diotophora fugax Schm., det. C. v. Nidek 1985' " (4 ♂ ♂ ABC). MASBATE: "Philippinen [*printed*], Masbate, Aroroy [*handwritten*] (on reverse: S. Boettcher, 8.1917) [*handwritten*]" (1 ♂ DEI; 7 ♀ ♀ ZMB). PANAY. ANTIQUE: "Panay, Culasi, R.C. McGregor; Coll. W. Horn, DEI Eberwalde" (1 ♀ DEI; HORN 1923). "N.W. Panay, Baker; Coll. W. Horn, DEI Eberswalde" (1 ♀ DEI). NEGROS. NEGROS OCCIDENTAL: "Negros, Mambucal, 28.IX.83, Nishikawa leg." (1 ♂ KWC). "Negros Island, Mount Canla-on, July 1990" (14 ♂ ♂, 11 ♀ ♀ CMNH; 2 ♂ ♂, 2 ♀ ♀ FCC; 1 ♀ BMNH; 1 ♂ ITZ; 1 ♂ HAC). "Silay, Patag, Malisbog River, River Dam 850m, 23.V.1996, lighttrap" (1 ♀ RMNH). NEGROS ORIENTAL: "probably nr. Dumaguete, Negros, P.I., J.W. Chapman [*printed*]" (1 ♂ MCZ); *with additional label*: "borrowed ex MCZ [*printed*]" (1 ♂ MCZ). "Philippines, Negros oriental, VII.85, leg. Romeo Lumawig" (3 ♂ ♂, 6 ♀ ♀ JWC; 1 ♀ HSC; 1 ♂, 1 ♀ MHC; 1 ♂ FCC); *same, but*: "8.VI.85, R. Lumawig" (1 ♂, 1 ♀ JWC). "Negros or., VI.86" (3 ♂ ♂, 2 ♀ ♀ KWC). LEYTE. SOUTHERN LEYTE: "St. Bernard, 13-15.VI.1967, Fr. E. Schoenig" (1 ♂ FCC); *same, but*: "20.VII.1967" (1 ♀ CMNH). BOHOL: "Bilar, February 1966, Fr. E. Schoenig" (1 ♂, 5 ♀ ♀ CMNH); *same, but*: "7.VII.1966" (1 ♀ CMNH; 1 ♂ FCC). "Bilar, 21.VII.1970,

T. Okadome" (1 ♂ MHC). "Candabong, 10 km NE Loboc, 12.XII.2001, A. Oesterle" (AOC). "3 km SE Bilar, 500 m, 13.XII.2001, A. Oesterle" (1 ♂, 1 ♀ FCC). MINDANAO: "Mindanao, 30.VII.1977" (1 ♀ FCC; 1 ♀ HAC). AGUSAN DEL NORTE: "Agusan, Cabadbaran, 19 June 1976, Fr. E. Schoenig [*printed*]" (4 ♂♂, 4 ♀♀ CMNH; 1 ♂ MSUC; 1 ♂, 2 ♀♀ FCC). DAVAO ORIENTAL: "Boston, Mt. Agtuuganon, Camp 55, 29.V-7.VI.1996, 1020m, Müller, Buenafe & Gorost" (1 ♀ RMNH).

Remarks. *Th. virginalis*, in the present sense, is a widespread species which appears to be in great evolutionary flux, since its populations show a strong tendency to subspeciate on the various islands of the Philippine Archipelago. Specimens from Negros Island, for example, have darker blackish colour of head and pronotum, a flat-tish, slightly longer, more parallel-sided pronotum, and a conspicuous elytral mirror spot in most females. Specimens from Masbate are also darker in colouration, with a shorter subsquared pronotum. Those from southern islands (Leyte, Bohol and Mindanao) have a longer male aedeagus (with basal collum more elongate) and more metallic green on head and pronotum. Female coupling sulci also slightly differ from each other, those of the holotype (from Luzon) differ from females from other localities on Luzon and other islands as they appear to be placed more dorsally along the posterior margin of the mesepisterna, with the pit located just below the base of the elytral epipleura. These variations suggest that subspeciation or even speciation may be occurring. However, because no definitive set of characters has yet been identified within populations it is imprudent at this time to further divide this species. Additional specimens in series from several more islands and different localities in Luzon will be required to clearly separate all or some of these populations. Therefore, for the time being at least, waiting for larger material from more islands and localities, we prefer to treat all the studied specimens under *virginalis*.

Recent collecting of *virginalis* on Bohol Island provided information (A. Oesterle, pers. comm.) about this species' ecology. Specimens were found first on a very rocky path in the man-made forest, Candabong (with mahogany and teak), 10 km NE of Loboc (fig. 26). The path appeared dark green because of mosses and algae. The colour of the beetles provided excellent camouflage as they were very difficult to spot, even if seen when landing. There was still a low level of beetle activity until 17:30, nearly at dusk. *Th. virginalis* was found to be more numerous near the edge of the Rajah Sikatuna

National Park, on a partly rocky and wet path that roughly represents the boundary between primary and secondary forest (fig. 27). The beetles were very active there (figs. 28-29), and when disturbed they either landed on the path again or on leaves of nearby low-level vegetation.

15. *Thopeutica (Thopeutica) pseudointerposita* (W. Horn)
(fig. 16 a-e)

Cicindela pseudo-interposita W. Horn, 1924a: 90 ["Insula Panaon (december 1915: coll. Boettcher)", ♂♂ ♀♀]. W. Horn, 1926: 164; 1929: 9; 1938: pl. 48, fig. 24. Döbler, 1973: 402.

Cylindera (Thopeutica) pseudointerposita (W. Horn). Schilder, 1953: 547.

Diotophora pseudointerposita (W. Horn). Rivalier, 1961: 137. Wiesner, 1980: 125.

Thopeutica (Thopeutica) pseudointerposita (W. Horn). Cassola, 1991: 521. Wiesner, 1992b: 171. Lorenz, 1998: 51.

Type Specimens. Five specimens in the DEI collection (2♂♂, 3♀♀), all labeled "Philippinen, Panaon", and, on reverse: "S. Boettcher/12.1915", and all bearing a red printed label "Syntypus", are considered to be the species' type series. The male specimen also bearing a yellowish label "pseudo-/interposita mihi", handwritten by W. Horn, is herein designated as lectotype. Consequently the other four specimens become paralectotypes; each is labeled as such. Eleven specimens in the ZMB collection, ranged under the name "virginea", all bearing the same locality label but lacking the red label "Syntypus", were certainly seen by W. Horn in the original series and are also considered to be paralectotypes. On the contrary, two male specimens in RMNH and one female specimen in CMNH, holding the very same locality label (on the obverse and the reverse), thus certainly coming from Böttcher's original series, are not included in the type series as there is no indication that they were either seen or used by W. Horn.

Specimens examined. Thirty-three specimens (including lectotype and fifteen paralectotypes).

Diagnosis. Length: 8.5-9.6 mm (without labrum). Similar to *virginalis* but with head and pronotum usually bright metallic blue-green. Pronotum globose between anterior and posterior sulci, approximately as wide as long, rounded at sides, antero-lateral corners setose, otherwise glabrous and smooth, with the disc more convex and globose than in *virginalis*. Female without elytral mirror spot. Sutural spine well developed, acuminate, longer in female than male. Aedeagus

fusiform, narrow and elongate, slightly saddle-backed on dorsal side, with a thin straight apex, ending in a small up-curved beak.

Redescription. *Head* olive-green to blue-green with violet reflections, bright metallic on antennal plates and genae, darker, slightly violaceous, behind on neck. Frons with very fine sub-concentric striae; vertex, entad of eyes, with coarse longitudinal striae (finer, shallower striae mesally); posteriorly with transverse wavy wrinkles of neck feebly impressed, stronger on genae and sides of vertex.

Antennae slender, nearly attaining the middle of the elytra (male, shorter in the female); scape and antennomere 2 metallic green, antennomeres 3-4 nearly glabrous, metallic bluish-violet, 5 slightly longer than 4, 5-11 dark rufous-brown.

Mouthparts. Labrum metallic bronze green with some bluish to golden reflections, short and transverse, over three times wider than long, raised mesally, each side with a broad, shallow depression and with five to seven submarginal setae, mesally with a pair of setae located near the base; anterior margin feebly produced with a small median tooth and lateral pair of obsolete teeth, antero-lateral corners subsquared. Mandibles elongate, base testaceous, teeth rufous, mesally metallic green; third pre-apical incisor obliquely truncate (distally projecting posterad). Maxillary and labial palpi testaceous, with the last palpomere dark metallic green (penultimate segment of maxillary palpi may be partially darkened).

Prothorax. Pronotum globose between sulci, approximately as wide as long, glabrous (except anterior corners) and smooth, with the disc distinctly, bright metallic green to blue-violet, sometimes with cuprous or golden reflections. Propleura smooth and glabrous with long white erect setae broadly scattered along the anterior and sterno-pleural edges; prosternum glabrous.

Pterothorax. Mesepisterna smooth and mostly glabrous, evenly excavated across surface, bright green to polished violet-black; ventral corner pilose. Coupling sulcus consisting of a shallow anterior dorso-ventral depression originating behind the pronotal corner, and a deep posterior dorso-ventral trough with a very deep elongate pit excavated beneath the humeral base of the elytron. Mesepimera, dorsal and posterior areas of metepisterna, postero-lateral corners of the mesosternum, and lateral oblique bands across each side of the metasternum clothed with recumbent white setae. Sterna and pleural sclerites bright metallic green with some golden reflections.

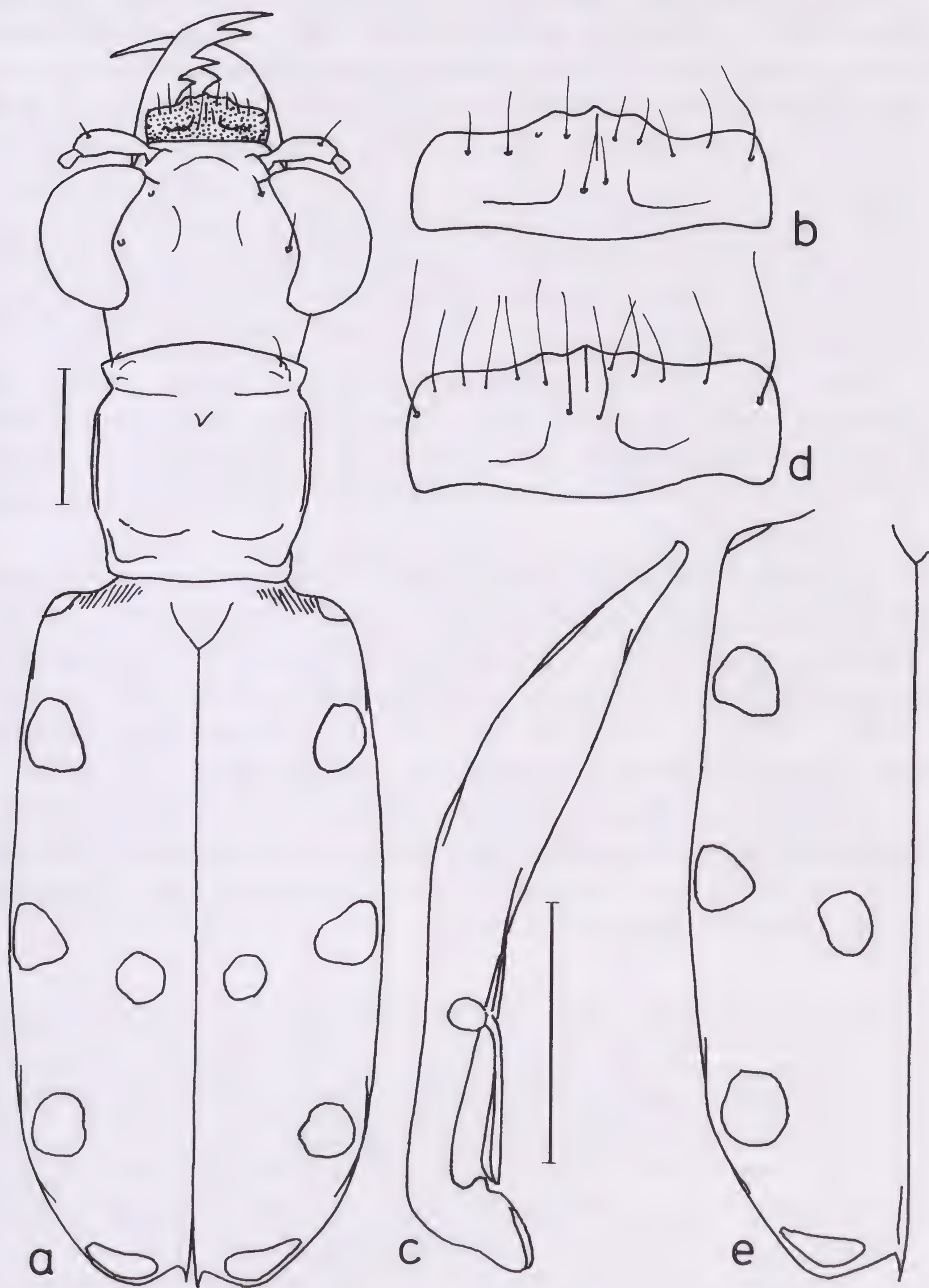


Fig. 16 - *Thopeutica* (*Thopeutica*) *pseudointerposita* (W. Horn, 1924). Paralectotype ♂ (ZMB): a. habitus, b. labrum, c. aedeagus; paralectotype ♀ (ZMB): d. labrum, e. left elytron. Scale-lines: 1 mm.

Elytra wider than width of head across eyes, subparallel-sided in male, slightly rounded at sides in female; dull, matte grayish-black, except at base which is shiny metallic green. Female without mirror spot. Maculation typically six spotted: humeral dot (present in both sexes), sub-humeral dot (usually slightly larger), marginal dot (tending toward transverse to subtriangular), discal dot (obliquely placed behind the marginal dot), sub-apical and apical dots (the latter one transverse, comma-shaped). Elytral apex obtusely angular, subtruncate with a well developed acuminate sutural spine, longer in female than in male. Epipleura metallic bronze with blue-violet reflections.

Legs. Pro- and mesocoxae anteriorly and lateral margins of metacoxae with recumbent white setae; femora with curved setae along the ventral margin. Trochanters rufous, basal half of femora metallic bluish-green, remainder of legs metallic dark bronze with violaceous reflections.

Abdomen. Visible abdominal sternum 1 glabrous or with at most a few posteriorly directed setae adjacent to the elytra; sternum 2 mostly glabrous, with a few (to many) setae forming a narrow band laterally; the remainder clothed with recumbent white setae, finer mesally. Visible sterna 3-5 each with two pairs of long tactile submarginal setae; abdominal sterna blue-green with golden-cuprous reflections.

Aedeagus fusiform, narrow and elongate, slightly saddle-backed on dorsal side, with a thin straight apex, ending in a small, up-curved beak.

Distribution. Philippine Islands: Leyte I. (Leyte, Southern Leyte); Panaon I. (Southern Leyte).

LOCALITY LABEL DATA. LEYTE. LEYTE: "Philippine Is., Leyte [*printed*], Hilongos, 21 Dec. 1977 [*handwritten*], Fr. E. Schoenig [*printed*]" (1 ♀ FCC). "Philippines, Leyte Is.: Baybay, 6 June 1977, Lorna Tuanggang [*printed*]" (1 ♀ CMNH). "Philippines, Leyte Is.: Baybay, 18 June 1977, Lorna Tuanggang [*printed*]" (1 ♂ CMNH; 1 ♀ FCC). "Philippines, Leyte, Baybay, Mt. Pangasugan, 30.III.88, A.M. Almeroda; Ex Malaise trap" (1 ♂ ViSCA). "Philippines: Leyte, ViSCA N Baybay, cultiv. land, 27.II.1991, leg. Schawaller & al." (1 ♀ JWC). "Leyte, ViSCA, 1994" (1 ♂ FCC; 1 ♀ HAC). "Leyte, ViSCA, V.1996, K. Kawano" (1 ♀ FCC; 1 ♂, 1 ♀ KWC). "8 km N Baybay, ViSCA, Pacubasan River, 60 m, 9.II.1994, P. Schütz" (1 ♂ AOC). SOUTHERN LEYTE: "Philippine Is., Leyte, Malitbog (South), 16 Dec. 1977, Fr. E. Schoenig" (1 ♀ CMNH). "Philippinen [*printed*], Panaon [*handwritten*] (*on reverse*: S. Boettcher, 12.1915) [*handwritten*]); Type, W. Horn [*printed*]; Syntypus [*red printed label*]; pseudo-in/terposita mihi [*yellowish rectangular label, handwritten by W. Horn*]", lectotype (1 ♂ DEI). "Philippinen [*printed*], Panaon [*handwritten*] (*on reverse*: S. Boettcher, 12.1915 [*handwritten*])", paralectotypes (7 ♂ ♂, 4 ♀ ♀ ZMB); *with additional label*: "Type, W. Horn [*printed*]; Syntypus [*red printed label*]", para-

lectotypes (1 ♂, 3 ♀♀ DEI); *with additional label*: “pseudointerposita Horn, Philippinae [*handwritten*]; Museum Leiden, collectie A.E. Kerkhoven [*printed*]” (1 ♂ RMNH); *with additional label*: “pseudointer-posita, acq. Staudinger [*handwritten*]; Museum Leiden, Ex coll. B.H. Klynstra [*printed*]; pseudo-interposita [*handwritten*]” (1 ♂ RMNH). “Philippinen [*printed*], Panaon [*handwritten*], Calder Collection [*printed*]” (1 ♀ UMIC). UNKNOWN ORIGIN: [no locality] (1 ♀ RMNH).

Remarks. The pronotum of most Leyte (Baybay) specimens, unlike that of the ones from Panaon (which is deep violet-blue to blue-green in colouration), is variably cupreous to blue-green with anterior and posterior collars blue-green. Due to the few specimens available, the close proximity of Leyte and Panaon islands, and the fact that typical *pseudointerposita* specimens (with blue-green to blue-violet head and pronotum) have been collected at Baybay itself and in other Leyte localities (Malitbog, Hilongos), we do not consider this difference to be of subspecific value.

Despite the fact that HORN (1924) described this species as a near relative of *interposita* (“Cic. virginea interposita m. simillima...”), these three species (*virginea*, *interposita* and *pseudointerposita*) all belong to well distinct species-groups, as it is demonstrated by the very different shape of their respective male aedeagi. *Th. pseudointerposita* is intermediate in size.

TRAUTNER & SCHAWALLER (1996) indicated that specimens collected in the ViSCA surroundings were found either in secondary forest (0-200m) or, in the ViSCA surroundings to Mount Pangasugan, in primary forest (200-500m).

STEM 5

Small to medium sized beetles (8.8-13.0 mm, without labrum). Labrum short and transverse (from two and half to three times as wide as long) with 6-12 twelve (usually 8-10) submarginal setae and one pair of discal setae set behind the median pair of submarginal setae. Mandibles with apical and 1st and 2nd pre-apical incisors closer to each other than the 2nd is to the 3rd pre-apical incisor; 3rd pre-apical incisor is in the form of a broad blade. Elytra dull matte black; granulate punctate, more strongly basad of marginal and discal dots, very finely distally; punctures metallic green. Aedeagus much inflated distad of base, with a long acuminate apex.

KEY TO SPECIES OF STEM 5

- 1a. Head and pronotum primarily metallic green, cuprous, blue or violet. Females without elytral mirror spots 2
- 1b. Head and pronotum primarily black, although usually with metallic highlights. Females with or without elytral mirror spots 3
- 2a. Pronotum smooth or irregularly shallowly wrinkled but without a shagreened appearance *interposita*
- 2b. Pronotum irregularly wrinkled with a shagreened appearance *zetteli*
- 3a. Smaller in size (length: 8.8-10.2mm). Females without mirror spots *pauper*
- 3b. Larger in size (length 11.0-13.0 mm). Females with or without mirror spots 4
- 4a. Apex of elytra rounded, retracted in both sexes; sutural spine of elytra small to very small, slightly more evident in females. Females with elytral mirror spots *simulatrix*
- 4b. Apex of elytra elongate and acute in male, rounded and slightly retracted in female; sutural spine of elytra conspicuous, straight and sharp in both sexes. Females without elytral mirror spots *palawanensis*

16. *Thopectica (Thopectica) interposita* (W. Horn), revised status (fig. 17 a-d)

Cicindela interposita W. Horn, 1892: 76 ["Luzon (Bilucan La Laguna; ex coll. Dr. Richter), ♂ ♀"]. W. Horn, 1893: 345.

Thopectica interposita (W. Horn). Fleutiaux, 1892: 132. Heyne, 1894: 30.

Cicindela virginea interposita W. Horn. W. Horn, 1900: 216; 1901: 358; 1905: 33; 1915: 283, 286; 1924: 88; 1926: 164. Schultze, 1916: 8. Wiesner, 1980: 125; 1992b: 171.

Cylindera (Thopectica) virginea interposita (W. Horn). Schilder, 1953: 547.

Diotophora virginea interposita (W. Horn). Wiesner, 1980: 125.

Thopectica (Thopectica) virginea interposita (W. Horn). Wiesner, 1992b: 171. Lorenz, 1998: 51.

Type Specimens. Type material not referenced by DÖBLER (1973). Two specimens (♂ ♀) in DEI collection, labeled "Bilucan, La Laguna, Luzon (Philippines); ex coll. Dr. Richter; Type! Dr. W.

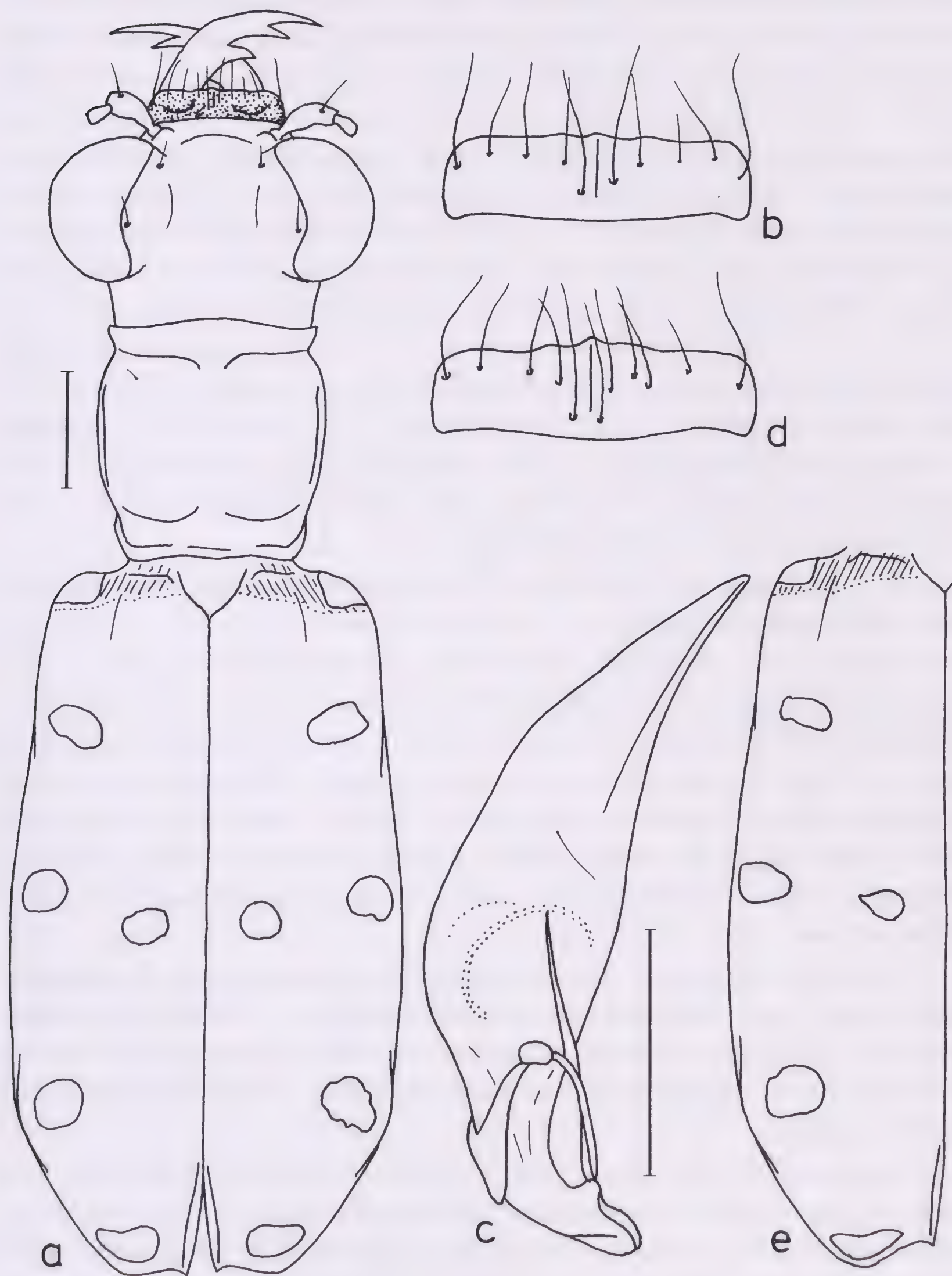


Fig. 17 - *Thopeutica (Thopeutica) interposita* (W. Horn, 1892). ♂ from "Mt. Banahao, II.1914, Boettcher" (FCC): a. habitus, b. labrum, c. aedeagus; ♀ as above (FCC): d. left elytron. Scale-lines: 1 mm.

Horn, Syntypus", are obviously the type specimens, and the male is here designated as the species lectotype. A third male specimen, also in DEI collection, bears all the same labels as above except the locality label, but also bears a yellowish label "f. interposita m." (handwritten by W. Horn), and is considered to be a paralectotype. Finally, a male specimen in the RMNH collection, with same labels as above (except the locality label), also bears an identification label "Thopeut. interposita W.H., Dr. W. Horn det., 1922" (handwritten by W. Horn) and a printed label "type" (apparently added subsequently); this is also considered to belong to the type series. Two specimens in ZMB and FCC collections, bearing the same printed locality label as the lectotype, apparently belonged to the original series of beetles. These labels also have the name of collector and date ("L. Laglaize 1875") which is lacking with the syntypes. These specimens are not considered to be paralectotypes because the species was established apparently on the specimens from the Richter collection only.

Specimens examined. Fifty specimens (including lectotype and three paralectotypes).

Diagnosis. Length: 10-11 mm (without labrum). Head and pronotum bright, shiny metallic blue-green to blue-violet in most specimens. Pronotum globose, sub-square, approximately as wide as long, rounded at sides, disc moderately convex, glabrous and smooth. Female without elytral mirror spot. Sutural spine of elytra small but distinct in both sexes, slightly longer in female. Male aedeagus abruptly swollen (inflated) after basal fourth, then tapering to a sharp point at apex.

Redescription. *Head* bright shiny metallic blue-green to blue-violet; very fine concentric striae on frons, coarse longitudinal striae entad of eyes (with finer shallower striae in the middle); vertex with transverse rugae weakly impressed, striae of genae and sides of vertex stronger.

Antennae slender, rather short, reaching approximately the first third of the elytral length; scape and antennomere 2 metallic green, antennomeres 3-4 metallic violet, nearly glabrous, 5 longer than 4, 5-11 dark rufous-brown.

Mouthparts. Labrum transverse, short, over three times wider than long; raised mesally at the base, each side with lateral depressions; anterior margin feebly tridentate with antero-lateral angles broadly rounded, colour metallic bronze-green with some bluish to

golden reflections; five to seven long submarginal setae on each side of labrum. Mandibles elongate, testaceous at base, rufous anteriorly and on teeth, sometimes with darker metallic luster in the middle. Maxillary and labial palpi testaceous with the ultimate palpomere dark metallic green.

Prothorax. Pronotum globose, subsquared, approximately as wide as long, rounded at sides, disc moderately convex, smooth and glabrous, bright shiny metallic green to blue-violet. Propleura smooth, metallic violet, mostly glabrous but with a band of erect white setae along the antero-ventral margin and behind procoxal base (1-3 setae). Prosternum glabrous.

Pterothorax. Mesepisterna mostly smooth, anteriorly shining black with violaceous reflections, posteriorly metallic green with a clump of white hairs at the postero-ventral corner. Coupling sulcus consisting of a deep, curved, dorso-ventral groove toward the posterior edge of the mesepisternum with the deepest point at the dorsal end, beneath the humeral angle of the elytron. Mesepimera metallic green, setose, metepisterna with few recumbent setae along dorsal margin and band of setae along posterior margin, mesosternum glabrous, metasternum with broad band of recumbent white setae adjacent to metacoxae. Metepisterna and sterna metallic green with some bluish-violet reflections.

Elytra wider than width of head across eyes, slightly rounded laterally; dull matte black, except at base where it is shiny blue-green. Female without mirror spot. Maculation typically six-spotted: humeral dot (present in both sexes), sub-humeral dot (slightly transverse in some specimens), marginal dot (tending toward transverse), discal dot (only slightly obliquely placed behind the marginal dot), sub-apical and apical dots (the latter one transverse, comma-shaped). Apex of elytra laterally oblique, sharply rounded, mesally retracted to elytral suture in male, slightly more retracted in female; sutural spine small to very small in both sexes. Epipleura rufous to dark bronze.

Legs. Anterior side of pro- and mesocoxae, and lateral margins of metacoxae clothed with recumbent white setae; ventral margin of femora with curved setae. Trochanters rufous; basal half of femora bluish-green, the remainder of the legs metallic dark bronze with violaceous reflections.

Abdomen. Visible abdominal sterna 1-2 glabrous (or with a few longitudinally oriented recumbent setae at the lateral edge), the

remaining sterna clothed with recumbent white pubescence, visible sterna 3-5 each with two (or three) pairs of submarginal tactile setae. Abdominal sterna blue-green with violet reflections.

Aedeagus abruptly swollen (inflated) after basal fourth; apical two-fifths tapered to a sharp point at apex.

Distribution. Philippine Islands: Luzon I. (Mountain Pr., Nueva Vizcaya, Laguna, Quezon); Mindoro I.?

LOCALITY LABEL DATA. PHILIPPINES: "Ex coll. Dr. Richter [*printed*]; Type! Dr. W. Horn [*printed*]; Syntypus [*red printed label*]; f. interposita mihi [*yellowish label, handwritten by W. Horn*]", paralectotype (1 ♂ DEI). "Ex coll. Dr. Richter [*printed*]; Type! Dr. W. Horn [*printed*]; type [*red printed label*]; Museum Leiden, collectie A.E. Kerkhoven [*printed*]; interposita Horn, Philippinae [*handwritten*]; Thopeut. inter/posita W. H., Dr. W. Horn det., 1922 [*handwritten by W. Horn*]", paralectotype (1 ♂ RMNH). "42462 [*printed*]; Maria m., Ins. Philipp. [*yellow label, handwritten by Schaum*]" (1 ♂ ZMB) ["Einige Ex. stecken in der Sammlung des hiesigen Museums unter dem Schaum'schen i.l. Namen 'Maria' ": HORN 1892: 76]. "Hist.-Coll. Nr. 42462, Ins. Philip." [*handwritten*] (1 ♂, 2 ♀♀ ZMB). "Philippines [*handwritten*]; v. Diana, D. W. Horn [*handwritten*]; interposita W. Horn, t. Horn [*handwritten*]; F. Bates Coll. 1911-248 [*printed*]" (1 ♀ BMNH). "Philipp.; coll. Baden Ruge [*handwritten*]; Coll. W. Horn, DEI Eberswalde [*printed*]" (1 ♀ DEI). "Philippinas" (1 ♂ MZLU). **LUZON/MINDORO?:** "Mindoro ou Luçon [*handwritten*]; Cicindela v. diana Thm. [*handwritten*]; interposita Horn, t. Horn [*handwritten*]; F. Bates Coll., 1911-248 [*printed*]" (1 ♀ BMNH). **LUZON:** "Luzon; 83072; virginea Schaum" (1 ♂ ZMB). "Luzon, P.I., Ex W. Horn; Cicindela virginea Schm. v. interposita Horn" (1 ♀ USNM). "Luzon, ex cab. Oberthür [*handwritten*]; coll. Ehlers V. de Poll [*printed*]; Coll. W. Horn, DEI Eberswalde [*printed*]" (1 ♂ DEI). "Luzon S[outh]" (1 ♂ ZMB). "Harris Collection [*printed*], Luzon, Phil. Is. [*handwritten*], Deut. Ent. Mus. [*printed*]; interposita Horn [*handwritten*]" (1 ♂ MCZ). "Luzon [*handwritten*]; Coll. Dokhtourov [*handwritten*]; Coll. O. Leonhard [*printed*]; virginea Sch. [*handwritten*]" (1 ♂ DEI). **MOUNTAIN PROV.:** "N. Luzon, Mt. Province, 27.V.86, R. Lumawig [*printed*]; Thopeutica virginea (Schaum, 1860), Det. F. Cassola, 1988 [*printed*]" (1 ♂ 2 ♀♀ JWC). **NUEVA VIZCAYA:** "Philippinen, Luzon, Imugan [*printed*]; (*on reverse*: S. Boettcher, 6.1917 [*handwritten*])" (1 ♂, 2 ♀♀ ZMB; 1 ♀ FCC). "Imugan, Santa Fe, 30-31.V.1987, C.K. Starr" (1 ♂ KWC). **LAGUNA:** "Bilucao, La Laguna, Luzon (Philippines) [*printed*]; ex coll. Dr. Richter [*printed*]; Type! Dr. W. Horn [*printed*]; Syntypus [*red printed label*]", lectotype (1 ♂ DEI). "Luçon, Bilucao la Laguna [*handwritten by W. Horn*]; ex coll. Dr. Richter [*printed*]; Type! Dr. W. Horn [*printed*]; Syntypus [*red printed label*]", paralectotype (1 ♀ DEI). "L. Laglaize 1875, Bilucao, La Laguna, Luzon (Philippines) [*printed*]", topotypes (1 ♂ ZMB; 1 ♀ FCC). "Luzon, Bilucao La Laguna [*handwritten*]; L. Laglaize, 1875 [*handwritten*]; Cic. (Thopeutica) virginea Schaum [*handwritten*], teste R. Gestro [*printed*]" (2 ♂♂ MSNG). "Luzon [*printed*]; Mt. Banahao, VIII.1914, G. Boettcher [*printed*]; 817 [*printed*]; Field Mus. (F. Psota Coll.) [*printed*]; Cic. virginea Schaum [*handwritten by K. Mandl*], det. Dr. Ing. K. Mandl 1959 [*printed*]" (1 ♂ FMNH). "Luzon; Mt. Banahao, VIII.1914, G. Boettcher" [*printed*] (1 ♂ ZMB); *same, but*: "VI.1914" (1 ♂, 3 ♀♀ ZMB; 1 ♂, 2 ♀♀ FCC); *with additional label*: "virginea Schm., acq. Staudinger [*handwritten*]; Museum Leiden, Ex coll. B.H. Klynstra [*printed*]" (1 ♂ RMNH); *with additional label*: "virginea Schaum, Philippinae [*handwritten by W. Horn?*]; Museum Leiden,

collectie A.E. Kerkhoven [*printed*]” (1 ♀ RMNH). QUEZON: “Quezon Park, Tayabas, Luzon, P.I. [*printed*], 19.VI.31 [*handwritten*]; F.C. Hadden Collector [*printed*]; Coll. W. Horn, DEI Eberswalde [*printed*]” (1 ♂ DEI). “Quezon Park, Tayabas, P.I., Alt. 1000ft [*printed*], VI.1.32 [*handwritten*]; F.C. Hadden Collection [*printed*]; ex coll. C.v. Nidek [*printed*]; *Diotophora virginea* Schaum, Rivalier det. [*handwritten by É. Rivalier*]” (1 ♀ ITZ). “Luzon, Tayabas pr., P.I., McGregor, Lucban [*handwritten*]; *Cic. virginea* Schm. [*handwritten by W. Horn*], Dr. W. Horn det. [*printed*]; Property USNM [*printed*]” (1 ♀ USNM, head lacking!). “Philippines, Quezon, Sierra Madre, IV.1978, J. Glaser; Glaser Collection” (2 ♂♂ CMNH); *with additional label*: “*Cicindela virginea* Schaum” (1 ♀ CMNH). “Philippines, Quezon, Sierra Madre, V.1978, Concepcion; Glaser Collection” (1 ♂, 1 ♀ FCC).

Remarks. Definitely a separate species, not a subspecies of *virginea* (which belongs to a different well-defined group). Specimens from Imugan (ZMB), Tayabas (CMNH) and Mountain Province (JWC) differ from typical *interposita* because of the narrower, longer and more violaceous pronotum, and strongly resemble *simulatrix* (see below) in some aspects. However, lack of female elytral mirror spot forces us to ascribe them to *interposita*. It is evident that separation and characters of both *interposita* and *simulatrix* need to be redefined, based on larger samples of both species. It may be that one or two separate species are presently confused amongst these forms.

The Böttcher specimens from “Luzon; Mt. Banahao, VI.1914” have pronotum more blackish-bronze to cuprous (less blue-green), with metallic green restricted to the transverse grooves only.

17. *Thopeutica (Thopeutica) pauper* (W. Horn), new status (fig. 18 a-d)

Cicindela (Thopeutica) intermedia [sic!] m. var. *paupera* [sic!] W. Horn, 1896a: 151 [“Luçon bor. (Whitehead); typus in coll. Rotschild, specim. alt. in eadem collectione et in mea”].

Cicindela (Thopeutica) interposita var. *pauper* W. Horn. W. Horn, 1896b: 358 [“‘*C. intermedia* m.’ statt ‘*C. interposita* m.’ gesetzt ist ... Eine *Cic. intermedia* m. existiert nicht...”].

Cicindela virginea Schm. (syn. *pauper* W. Horn). W. Horn, 1900: 216; 1905: 33; 1926: 164.

Diotophora virginea pauper (W. Horn). Rivalier, 1961: 137. Wiesner, 1980: 125.

Thopeutica (Thopeutica) virginea paupera (W. Horn). Wiesner, 1992b: 171. Lorenz, 1998: 51.

Type Specimens. Holotype, ♂, in Rothschild collection (not seen); two paratypes (♂ ♀) in DEI (DÖBLER, 1973), both of which have been examined.

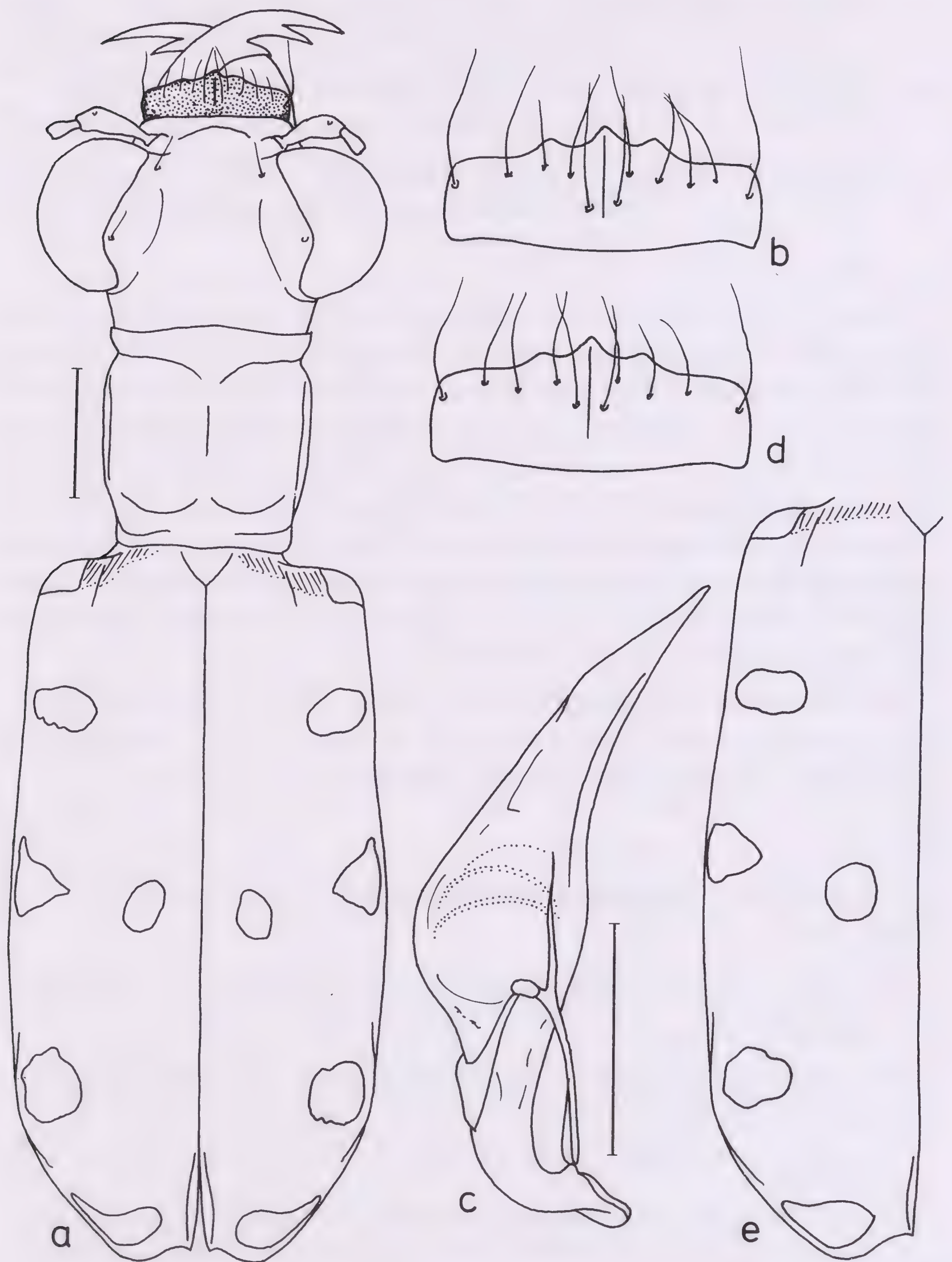


Fig. 18 - *Thopeutica (Thopeutica) pauper* (W. Horn, 1896). ♂ from "N. Luzon, Whitehead" (FCC): a. habitus, b. labrum, c. aedeagus; ♀ from "N. Luzon" (FCC): d. left elytron. Scale-lines: 1 mm.

Specimens examined. Twenty-two specimens (including the two paratypes).

Diagnosis. Length: 8.8-10.2 mm (without labrum). Head and pronotum dark bronze to bronze-green with cupreous to green metallic reflections. Pronotum subsquare, approximately as wide as long, slightly rounded at sides, disc moderately convex, glabrous, slightly wrinkled but not shagreened; postero-lateral angles stronger than those of *virginea*. Elytra relatively short; female without mirror spot. Sutural spine very small, sometimes lacking. Aedeagus abruptly expanded dorsally after basal fourth, appearing quite swollen; apical third slightly curved ventrally, tapered to a sharp point at apex.

Redescription. *Head* dark bronze with cuprous reflections around eyes; clypeus, antennal plates, vertex behind the eyes and genae tinged with metallic green. Frons with very fine concentric striae; coarse, longitudinal striae entad of eyes and on genae; finer, shallow striae on vertex; wavy to irregular transverse wrinkles behind eyes on neck.

Antennae slender, nearly reaching the middle of elytra; scape and antennomere 2 tinged with metallic golden-green, antennomeres 3-4 metallic bluish-violet, nearly glabrous, 5 longer than 4, 5-11 dark rufous-brown.

Mouthparts. Labrum short, transverse, approximately three times wider than long, raised in the middle at base, each side with large lateral depressions and five to six long, submarginal setae (including a medial pair set behind the submarginal row), the anterior margin tridentate, marginal teeth sometimes rounded or reduced to smooth bumps; light metallic bronze, with golden-green reflections laterally, sometimes testaceous in the anterior half. Mandibles testaceous over basal half, rufous apically and on teeth, tinged with metallic green mesally. Maxillary and labial palpi testaceous, with the ultimate palpomere dark metallic green.

Prothorax. Pronotum subsquare, approximately as wide as long, slightly rounded laterally, dark bronze with cuprous reflections on disc and collars; disc moderately convex, glabrous, shallowly wrinkled (but not shagreened), postero-lateral angles pronounced; anterior and posterior constrictions and postero-lateral angles tinged with metallic green. Propleura smooth and mostly glabrous, a band of long white decumbent setae (or punctures) present in a band along the sterno-pleural suture; metallic bronze with green to cuprous reflections.

Prosternum smooth, completely glabrous.

Pterothorax. Mesepisternum mostly flat, with a shallow dorso-ventral depression; surface smooth, mostly glabrous, glossy black, ventral angle grainy and dull metallic cuprous-green, with a few white setae. Mesepisternal coupling sulcus consisting of a relatively shallow pit in the depression just beneath the basal margin of the elytron. Mesepimera setose, metepisterna more sparsely setose, mesosternum glabrous, metasternum with a few recumbent white setae along the anterior margin, laterally setose. Metepisterna and sterna metallic golden-green with bluish reflections.

Elytra slightly wider than width of head across eyes, subparallel-sided; color dull, matte black, except at base which is shiny cuprous to green. Females without mirror spot. Maculation typically six spotted: humeral dot (present in both sexes), sub-humeral dot (slightly transverse), marginal dot (tending to subtriangular), discal dot (placed nearly on the same transverse line as the marginal dot), sub-apical and apical dots (the latter one transverse, comma-shaped). Apex of elytra rounded, slightly retracted; sutural spine very small, sometimes effaced. Epipleura rufous to dark bronze.

Legs. Anterior sides of pro- and mesocoxae and lateral margins of metacoxae clothed with recumbent white setae; femora with ventral margin with curved setae. Trochanters rufous-testaceous, femora basally more or less metallic green, remainder of legs metallic dark bronze with violaceous reflections (tibiae sometimes slightly rufescent).

Abdomen. Abdominal sterna 1-2 with lateral bands white recumbent setae; 3-5 punctate, more broadly clothed with white recumbent setae (finer setae mesally), each with two pairs of submarginal tactile setae; sterna blue-green with golden reflections.

Aedeagus abruptly expanded dorsally after basal fourth, appearing quite swollen; apical third slightly curved ventrally, tapered to a sharp point at apex.

Distribution. Philippine Islands: Luzon I. (N & NE Luzon).

LOCALITY LABEL DATA. PHILIPPINES: "Philippines, Whitehead; virginea Schm., v. Horn; F. Bates Coll., 1911-248; virginea Schm., t. Horn" (1 ♂, 2 ♀♀ BMNH; 1 ♀ FCC). LUZON: "N. Luzon (Whitehead .94) [*printed*]; Tring Mus. [*printed*]; Type! Dr. W. Horn [*printed*]; Paratypus [*red printed label*]; pauper mihi [*yellowish label, handwritten by W. Horn*]", paratype (1 ♂ DEI).

"Tring Museum [*printed*], N-Luzon, Whitehead .94 [*handwritten*]; Type! Dr. W. Horn [*printed*]; Paratypus [*printed red label*]", paratype (1 ♀ DEI). "N. Luzon, Whitehead; F. Bates Coll. 1911-248" (1 ♀ BMNH; 1 ♀ CMNH; 1 ♂ DEI); *with additional label*: "Museum Leiden, Ex coll. B.H. Klynstra, C. virginea Schm., Dr. W. Horn det. 1923" (1 ♂ RMNH). "N.E. Luzon, 95-151, Whitehead" (1 ♂ NMNH); *with additional label*: "interposita v. pauper [*handwritten by W. Horn?*]" (1 ♂ BMNH). "Phillip. Islands [*printed*]; N. Luzon [*handwritten*]; Whitehead; Fry Coll. 1905-100" [*printed*], "clara Schm." [*handwritten by W. Horn?*] (1 ♀ BMNH). "Phillip. Islands [*printed*]; N. Luzon [*handwritten*]; Whitehead; Fry Coll. 1905-100" [*printed*]" (1 ♂ BMNH). "N. Luzon, F. Bates Coll. 1911-248" (2 ♂♂ BMNH; 1 ♂ CMNH; 1 ♂ FCC); *with additional label*: "virginea Schm., t. Horn" (1 ♀ FCC); *with additional label*: "virginea Schm. [*handwritten*]; name passed by Dr. W. Horn in Coll. F. Bates [*printed*]" (1 ♂, 1 ♀ BMNH). "Luzon; C. interposita m. v. pauper m., determinavit Dr. W. Horn" (1 ♂ ZMB).

Remarks. Definitely a separate species, neither a synonym nor a subspecies of *virginea*, and easily recognizable in the group by its smaller size and proportionately shorter elytra, metallic colour on head and pronotum and absence of mirror spots in females.

18. *Thopeutica (Thopeutica) zetteli* n. sp. (fig. 19 a-d)

Diagnosis. Length: 9-10 mm (without labrum). Superficially similar to *pseudointerposita* in size and body color, however belonging to the *interposita* group by way of the characteristic shape of the aedeagus. Head and pronotum more bluish-violet in color, discal dot of elytral markings placed more in front, not obliquely behind the marginal dot, sometimes even a bit more advanced than the marginal dot. Females without elytral mirror spot; sutural spine smaller than that of *pseudointerposita*. Also reminiscent of *interposita*, however smaller in size, with the pronotum shagreened and finely wrinkled instead of smooth.

Description. *Head* with clypeus metallic green to blue with strong violet reflections, especially on hind half of genae, antennal plates metallic blue-green, smooth; glabrous, just two setigerous punctures near both eyes. Eyes rather large, globose, however vertex also a bit raised. Sculpture extremely fine on frons and vertex, transversely waved behind on neck; coarser longitudinal striae entad of eyes, strong longitudinal striae on genae.

Antennae. Antennae slender, reaching approximately half of the elytral length in male, shorter in female; scape metallic green,

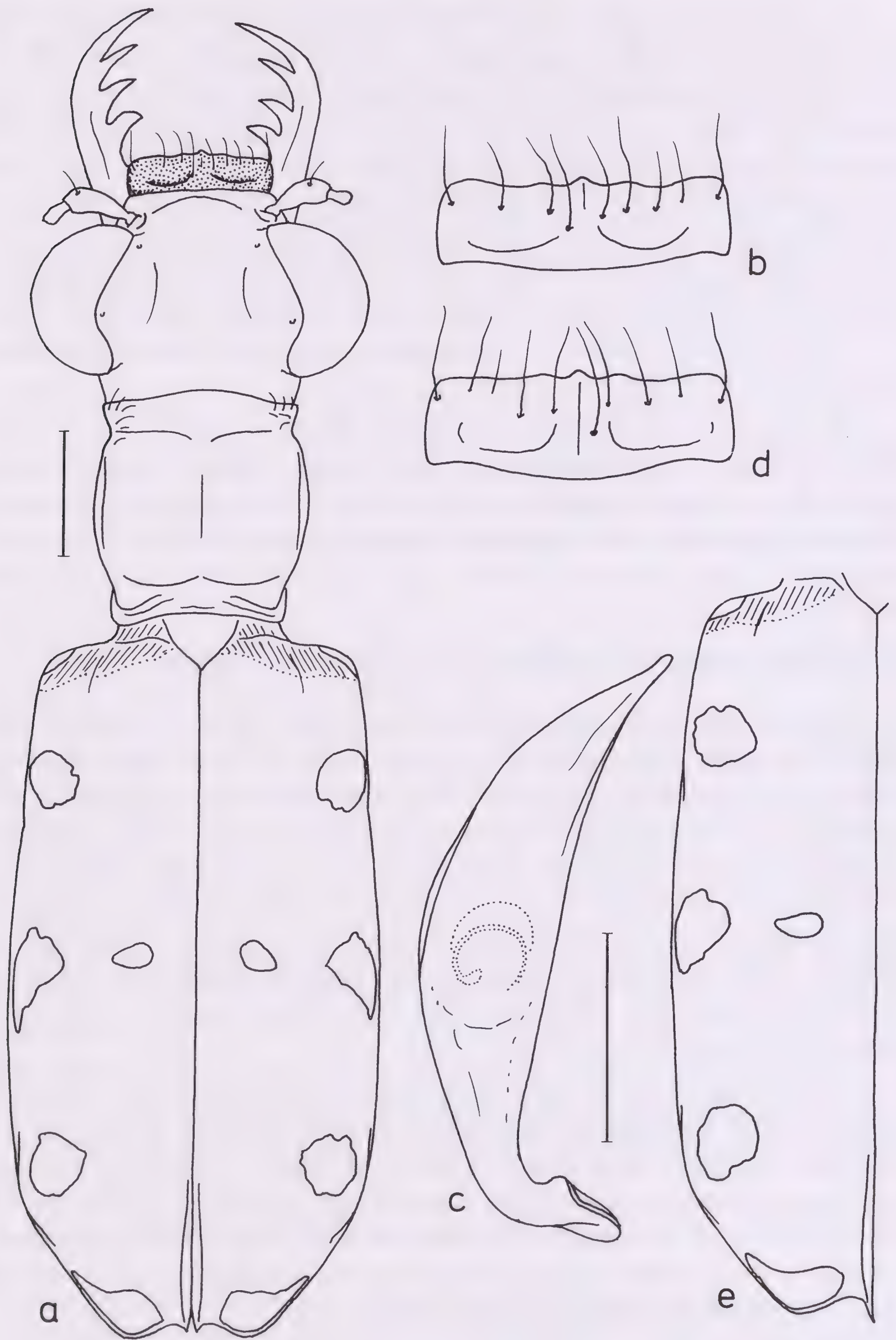


Fig. 19 - *Thopeutica (Thopeutica) zetteli* n. sp. Holotype ♂ (NMW): a. habitus, b. labrum, c. aedeagus; allotype ♀ (NMW): d. left elytron. Scale-lines: 1 mm.

antennomeres 2-4 metallic bluish-green to violet, with one or two small spiniform setae, 5-11 dull black; antennomere 5 longer than 4.

Mouthparts. Labrum metallic black with violet and green reflections, especially on lateral sides; short and transverse, approximately four times as wide than long, raised in the middle, with a short longitudinal carina on the middle tooth, feebly tridentate in front, the central tooth short but evident in both sexes; 3-4 submarginal long hairs and one discal hair on each side. Mandibles elongate, testaceous on outer base, shortly pitchy black with some green metallic hue in the middle, rufous to brown on teeth. Maxillary and labial palpi testaceous, with the last joint metallic green.

Prothorax. Pronotum subsquare, approximately as long as wide in both sexes, rounded laterally, disc slightly globose, postero-lateral angles small, poorly apparent; surface irregularly wrinkled, shagreened. Colour blue-green with violet reflections, especially in anterior and posterior constrictions. Prosternum and propleuron mostly glabrous, but a few semi-erect white setae adjacent to the antero-dorsal edge of propleuron and at sides of anterior collar, sometimes one or two small setae at sides of pronotum and on the posterior collar.

Pterothorax. Mesepisterna smooth, polished violaceous-black, with just a few white setae ventrally and laterally near the mesepimera. Coupling sulcus consisting of a deep rounded pit in the middle of the mesepisterna, well removed from the mesopleural suture. Mesepimera, the posterior margins of the metasternum and the dorsal half of the metepisterna clothed with recumbent white setae. Mesepimera, metepisterna and sterna metallic bluish-green with violet reflections.

Elytra slightly broader than width of head across eyes, subparallel-sided, slightly expanded in the middle; dull black, except for the extreme base which is shiny metallic bluish-green. Female elytral mirror spot lacking. Elytral maculation consisting of six small dots: humeral (present in both sexes), sub-humeral (roundish, slightly larger), submarginal (large, subtriangular), discal (small roundish to transverse, placed at the same line or slightly more in front than the marginal dot), sub-apical (irregularly roundish) and apical (transverse, comma-shaped). Apical margin of elytra slightly emarginate, very finely microserulate; sutural spine small but evident in both sexes. Epipleura metallic blackish-bronze.

Legs. Anterior sides of pro- and mesocoxae and lateral margins of metacoxae with white recumbent setae; femora with a few rows of

erect, white setae, those of posterior row curved; tibiae and tarsi with short spiniform setae; distal half of mesotibiae with more numerous rufescent setae (grooming organ). Trochanters testaceous, basal half of femora metallic green, remainder of legs metallic violet-bronze.

Abdomen. Abdominal sterna metallic golden- to bluish- green; visible sterna 1-2 almost glabrous, sides of sterna 3-5 covered with rather long, white setae, the distal sterna with finer shorter pubescence.

Aedeagus arc-shaped, curved ventrally, tapering, swollen in the middle, with a long, nearly pointed, very slightly button-ended, apex.

Etymology. This species is so named in honor of Herbert Zettel (Naturhistorisches Museum Wien, Austria), a well-known specialist of Philippine Heteroptera, who personally collected it recently on Catanduanes Island, during one of his frequent visits to the Philippines, and kindly submitted the specimens for identification.

Distribution. Philippine Islands: Catanduanes I. (Catanduanes).

Type Specimens. Holotype ♂, allotype ♀ and 10 paratypes (5 ♂♂, 4 ♀♀), from CATANDUANES: E San Andres, 11-12.III.1999, H. Zettel leg.; nine paratypes (4 ♂♂, 5 ♀♀) from same locality, below Lu Yong cave, 12.IV.2000, H. Zettel leg.. Two additional paratypes also from Catanduanes: IX.1997, I.O. Lumawig leg.. Deposition of type specimens: holotype (UPLB), allotype (NMW), paratypes (3 ♂♂, 2 ♀♀ FCC; 1 ♂ JWC; 1 ♂ MSNG; 2 ♂♂, 4 ♀♀ UPLB; 4 ♂♂, 4 ♀♀ ZVC).

Remarks. These specimens were all collected on steep rocks running about 20-30 meters along a stream, near a water cascade which was very slippery, below Lu Yong cave. This cave is easy to find, as there is a sign on the main road which runs along the slope of the hill about 100 m above the stream (Zettel, pers. comm.).

19. *Thopeutica (Thopeutica) simulatrix* (W. Horn) (fig. 20 a-d)

Cicindela (Thopeutica) simulatrix W. Horn, 1896a: 150 ["1 ♂ ♀. Ins. Philipp.; typus in coll. Rotschild, specim. alt. in mea"]. W. Horn, 1905: 33; 1908-1915: 280, 283, 286; 1926: 164; 1938, pl. 48 (fig. 21). Schultze, 1916: 8. Döbler, 1973: 410.

Cylindera (Thopeutica) simulatrix (W. Horn). Schilder, 1953: 547.

Diotophora simulatrix (W. Horn). Rivalier, 1961: 137. Wiesner, 1980: 125.

Thopeutica (Thopeutica) simulatrix (W. Horn). Cassola, 1991: 521. Wiesner, 1992b: 171. Lorenz, 1998: 51.

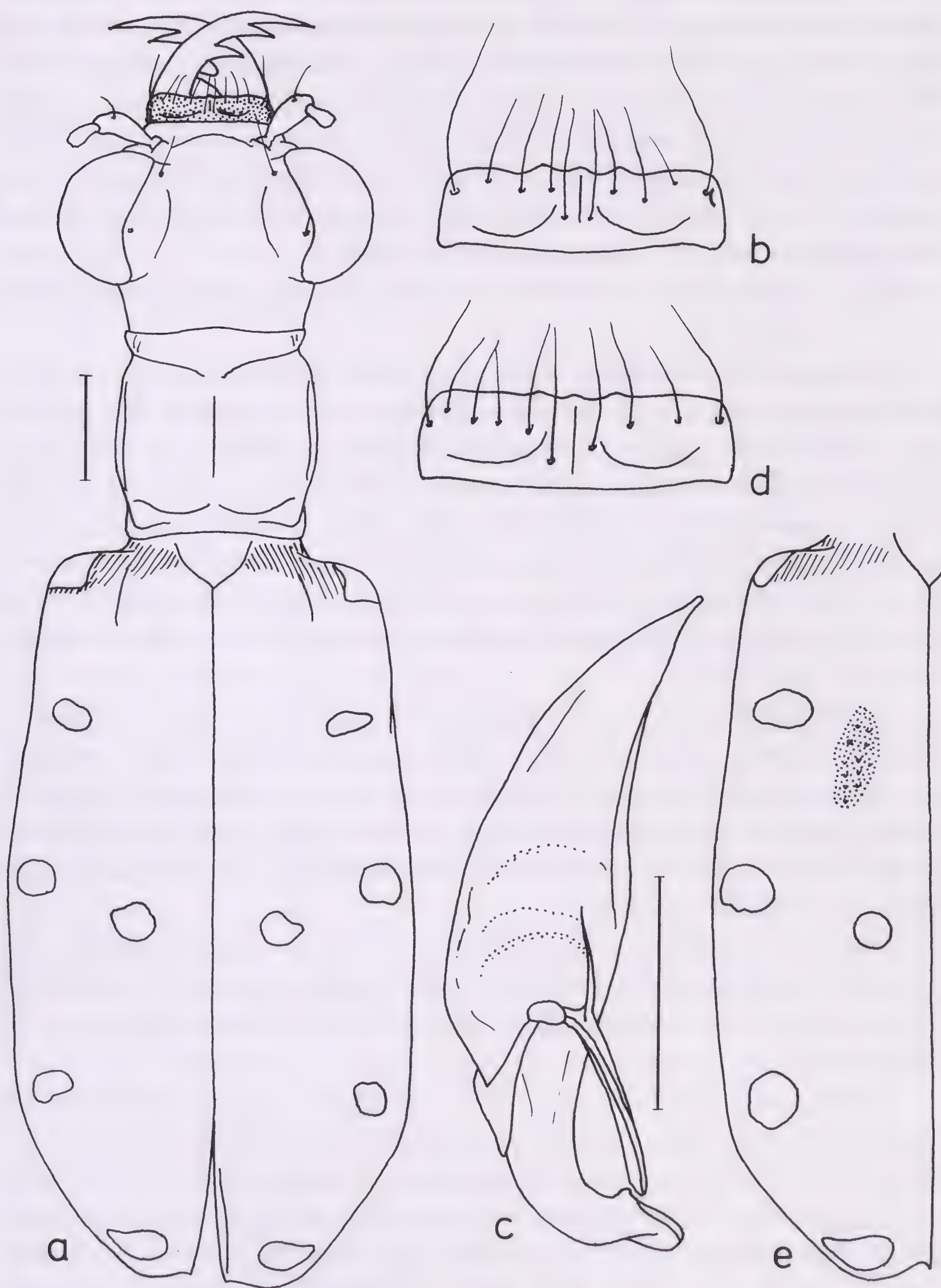


Fig. 20 - *Thopeutica* (*Thopeutica*) *simulatrix* (W. Horn, 1896). ♂ from "Jackmal Bunhian, 24 km E Mayoyao, Ifugao prov." (FCC): a. habitus, b. labrum, c. aedeagus; ♀ as above (FCC): d. left elytron. Scale-lines: 1 mm.

Type Specimens. This species was described from two specimens, the holotype male and female paratype from "Ins. Philipp.", respectively in Rothschild and W. Horn collections (HORN, 1896a). The female paratype is in the DEI Collection (DÖBLER, 1973) and it was examined. Our concept of the male is based on a specimen in the RMNH, from the Baden Ruge Collection, which had been seen and identified by W. Horn himself in 1923, as well as on two additional male specimens in W. Horn collection (DEI).

Specimens examined. Twenty-seven specimens (including the female paratype).

Diagnosis. Length: 11.0-12.5 mm (without labrum). Superficially similar to *conspicua* except smaller in size; head and pronotum black with a violet tint and bluish-green reflections. Pronotum sub-rectangular in shape, anteriorly convexly narrowed (as a barrel), glabrous, dark with cupric-green reflections. Female elytral mirror relatively small, oval-shaped, glossy black. Sutural spine small to very small, slightly more evident in females. Aedeagus abruptly swollen after the first third (from base), appearing quite globose, then tapering to a point at the apex.

Redescription. *Head* black with a violet tint and bluish-green reflections around eyes, vertex and clypeus; genae more or less metallic violet to green. Very fine sub-concentric striae on frons, coarse longitudinal striae entad of eyes (with more random, shallower striae mesally); transverse rugae of vertex weakly impressed, stronger on genae and sides of vertex.

Antennae slender, rather short, reaching approximately the first third of the elytral length; scape metallic green, antennomeres 2-4 metallic violet, nearly glabrous, 5 slightly longer than 4, 5-11 rufescent.

Mouthparts. Labrum short and transverse, approximately three times wider than long, raised in the middle at base, each side with a lateral depression and five to seven long submarginal setae (including a median pair well removed from the anterior margin); anterior margin feebly tridentate, with teeth rounded or reduced to smooth bumps; metallic black with violet and green reflections. Mandibles elongate, testaceous at base, rufous apically and on teeth; 3rd pre-apical incisor forming an acute, blade-like triangle well separated from the 2nd pre-apical incisor and basal tooth. Maxillary and labial palpi testaceous with the ultimate palpomere dark, tinged with metallic green.

Prothorax. Pronotum subrectangular in shape, anteriorly convexly narrowed (as with a barrel), glabrous, dark with cupric green reflections; disc with shallow to nearly effaced transverse or meandering rugae, striae somewhat stronger on anterior and posterior collars; median longitudinal line shallow. Colour black to dull metallic violet, with blue-green metallic highlights laterally and on anterior and posterior collars and constrictions. Propleura smooth and glabrous in the dorsal half, with long white erect setae along the pleuro-sternal suture; dark bronze with violet and green reflections. Prosternum glabrous, smooth.

Pterothorax. Mesepisterna polished black, smooth (female) or grainy, dull, blackish-green (male), with one to a few decumbent setae along the posterior margin and at the ventral angle. Coupling sulcus consisting of a broad antero-dorsal depression extending ventrally from between the pronotum and elytral base and a deep elongate pit at the posterior edge of the mesepisterna that extends beneath the elytral base. Mesepimera, antero-dorsal margin, posterior area of metepisterna and sides of metasternum clothed with rather long, decumbent, white setae. Mesosternum glabrous.

Elytra wider than width of head across eyes, slightly rounded laterally; dull matte black, except at base and extreme apex where it is shiny. Females with elytral mirror relatively small and narrow, longitudinally oval-shaped, glossy black and granulate punctate. Elytral maculation consists of six small dots: humeral (present in both sexes), sub-humeral (rounded to transverse), marginal, discal (obliquely placed behind and usually smaller than the marginal dot), sub-apical and apical (the latter transverse, slightly comma-shaped). Apex of elytra rounded, retracted in both sexes; sutural spine of elytra small to very small, slightly more evident in females. Epipleura rufous to dark bronze.

Legs. Anterior side of pro- and mesocoxae, and lateral margins of metacoxae clothed with rather long white setae; femora with curved hairs along ventral margin. Trochanters rufous, remainder of legs metallic dark bronze with violaceous reflections, femora with curved hairs along ventral margin.

Abdomen. Visible abdominal sternum 1 with a thin band of setae in the antero-dorsal corner; sternum 2 with a broad lateral band of recumbent setae, remaining sterna clothed with white recumbent setae (thinned mesally); visible sterna 3-5 each with two pairs of

submarginal tactile setae. Sterna blue-green with violet to golden reflections.

Aedeagus abruptly swollen after the first third (from base), appearing quite globose, then tapering to a point at the apex.

Distribution. Philippine Islands: Luzon I. (Mountain prov., Ifugao, Laguna); Mindanao I.?

LOCALITY LABEL DATA. PHILIPPINES: "Philippines [*yellowish, oval, handwritten label*]; Tring Mus. [*printed*]; Type! Dr. W. Horn [*printed*]; Paratypus [*red printed label*]; simulatrix mihi [*yellowish rectangular label, handwritten by W. Horn*]", paratype (1 ♀ DEI). "Philipp.; Coll. Baden Ruge" (1 ♂ DEI); *with additional label*: "C. simulatrix W. H., Dr. W. Horn det., 1923; Museum Leiden, Ex coll. B.H. Klynstra; simulatrix W. Horn" (1 ♂ RMNH). "Philipp.; Coll. Waagen" (1 ♀ DEI). "Phillip.e Islands; Fry Coll. 1905-100" (1 ♀ BMNH). "Phil. Isl." (1 ♂ BMNH). "Philippinen, 83060, Coll. H.C. Vogel" (1 ♀ ZMB). **LUZON:** "Luçon, C. conspicua Schaum; F. Bates Coll., 1911-248" (1 ♀ BMNH). **MOUNTAIN PROV.:** "N-Luzon, Mount. province, VII.86" (1 ♂, 1 ♀ KWC; 1 ♂ FCC). **IFUGAO:** "Ifugao Province, Jackmal Bunhian, 24 km E Mayo-yao, 800-1000m, 9-12.IV.1967, H.M. Torre Villas" (1 ♂, 1 ♀ FCC). "Ifugao, Mayoyao, 1000-1500m, 6.VII.1966, H.M. Torre Villas" (1 ♂ BPBM). "Ifugao Prov., Liwo, 8 km East Mayoyao, 1000-1300m, 27-30.IV.1967, H.M. Torre Villas" (1 ♂, 2 ♀♀ BPBM; 1 ♂, 1 ♀ CMNH). "N. Luzon, Banaue, 15.V.1988" (1 ♀ HSC); *with additional label*: "Acciavatti Collection" (1 ♀ CMHN). "20 km S. Banaue, 14.VI.1989, R. Naviaux" (2 ♂♂, 1 ♀ RNC; 1 ♂ FCC). **LAGUNA:** "Manilla" (1 ♂ DEI). **MINDANAO:** "Mindanao, conspicua Schaum, v. W. Horn; F. Bates Coll., 1911-248" (1 ♀ BMNH) [doubtful record!].

Remarks. Upon comparison with female paratype and other specimens from W. Horn's collection, we ascribe to *simulatrix* also specimens from Mayoyao and Banaue, Ifugao Province, Luzon, which are smaller in average size, have a shorter, subsquared pronotum, and strongly recall the specimens from Imugan, Tayabas and Mountain Province which have been mentioned above under *interposita*. However, all other characters, including the distinctive, granulate punctate, female elytral mirror, clearly fit those of *simulatrix*. The occurrence of this species in Mindanao appears to be doubtful.

20. *Thopectica (Thopectica) palawanensis* n. sp. (fig. 21 a-e)

Diagnosis. Length: 11.5-13.0 mm (without labrum). Superficially similar to *simulatrix* but narrower, more parallel-sided; head and pronotum black with a bluish-violet tint and green or cuprous reflections. Pronotum subsquare, as long or slightly longer than wide, glabrous, shagreened. Female elytral mirror lacking. Apex of elytra

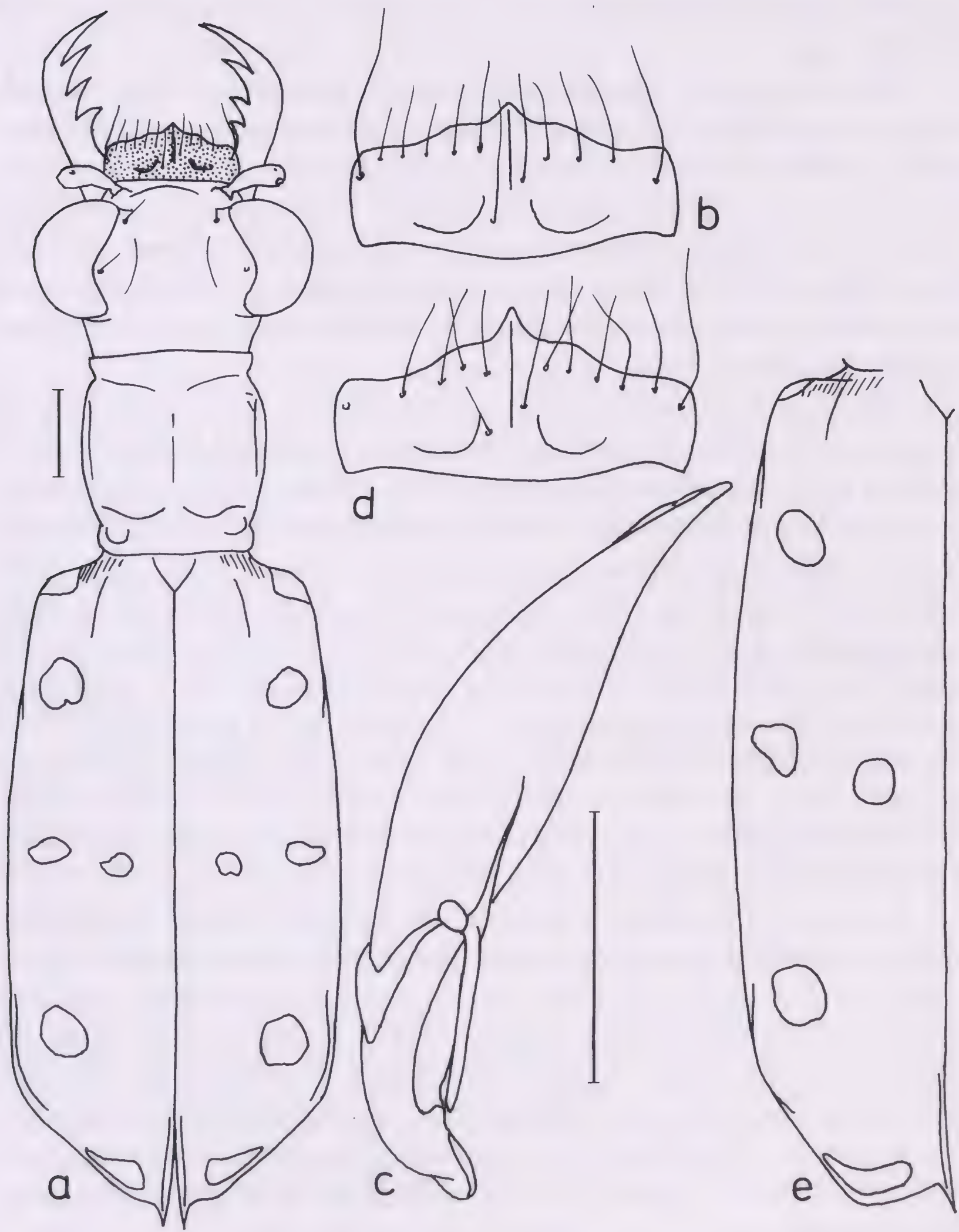


Fig. 21 - *Thopeutica (Thopeutica) palawanensis* n. sp. Holotype ♂ (SMNS): a. habitus, b. labrum, c. aedeagus; ♀ from "Palawan, Salakot Falls, Napsan side" (FCC): d. labrum, e. left elytron. Scale-lines: 1 mm.

elongate and acute in male, rounded and slightly retracted in female; sutural spine of elytra conspicuous and sharp in both sexes. Aedeagus almost straight, strongly globose in the middle, with a long, weakly curved apex.

Description. *Head* black with a slight violet hue, metallic golden- to bluish-green on genae, sides of clypeus and antennal plates; cuprous reflections medially on clypeus; glabrous, just two setigerous punctures near both eyes. Eyes rather large, globose, prominent on vertex. Sculpture extremely fine, with concentric striae on frons. Coarser longitudinal striae entad of eyes (with finer, shallower striae in the middle of vertex), strong longitudinal striae on genae and transversally on sides of neck.

Antennae slender, reaching approximately half of the elytral length in the male, shorter in the female; scape and antennomere 2 metallic green, antennomeres 3-4 metallic green to violet, with one to three small spiniform setae, 5 slightly longer than 4, 5-11 dull black.

Mouthparts. Labrum metallic black with violet and green reflections, transverse, two times and one half wider than long, subtriangular in front, the central tooth strongly protruding in both sexes; raised and with a conspicuous longitudinal carina in the middle, each side with a lateral depression, 4-5 submarginal long setae and one discal seta near the carina on each side. Mandibles elongate, testaceous on outer base, metallic green at the middle, dark brown to rufous on teeth. Maxillary palpi metallic dark-brown to green, labial palpi testaceous, with the last joint metallic green.

Prothorax. Pronotum subsquare, as long or slightly longer than wide, anterior and posterior constrictions conspicuous, collars narrow, postero-lateral angles rounded, produced; disc irregularly wrinkled. Dark bronze, with blue-green to violet reflections; anterior and posterior constrictions metallic bluish-green, postero-lateral angles cuprous to dark violet. Prosternum smooth, almost glabrous, metallic green with bluish reflections; propleuron smooth, violaceous-green, dorsally glabrous, with white, long, recumbent setae along the sterno-pleural suture.

Pterothorax. Mesepisterna slightly shagreened, polished violaceous-black, with just a few white setae ventrad. Coupling sulcus consisting of a deep fovea in the middle of the mesepisternum, near and below the mesepimeral rim. Mesepimera, metepisterna and sternum clothed with recumbent white setae, except posteriorly on the middle

of the sternum; metallic bluish-green with golden to cuprous reflections.

Elytra slightly wider than width of head across eyes, parallel-sided; dull black, except at extreme base and sutural apex which is shiny. Female elytral mirror spot lacking. Elytral maculation consisting of six small dots: humeral (present in both sexes), subhumeral (somewhat rounded to transverse), submarginal, discal (usually smaller than the marginal dot), sub-apical and apical (the latter transverse, comma-shaped). Apex of elytra elongate and acute in male, rounded and slightly retracted in female; sutural spine of elytra conspicuous, straight and sharp in both sexes. Epipleura metallic bluish-black.

Legs. Anterior side of pro- and mesocoxae and lateral margins of metacoxae with recumbent white setae; femora with a few rows of erect, curved hairs on basal half, tibiae and tarsi with some short spiniform setae. Trochanters dark brown to black; remainder of legs metallic dark bronze with green to violaceous reflections.

Abdomen. Abdominal sterna golden- to bluish-green, wholly clothed with white recumbent setae except for the postero-mesal half of visible sterna 3-5, which have each two pairs of long tactile submarginal setae.

Aedeagus. Aedeagus almost straight, strongly swollen in the middle, with a long weakly curved apex.

Etymology. Since Palawan represents a significant biogeographical range extension for the genus, it is appropriate that species be named after this island where it was collected.

Distribution. Philippine Islands: Palawan I. (Palawan).

Type Specimens. Holotype ♂, allotype ♀ and 12 paratype specimens (5 ♂♂, 7 ♀♀), from PALAWAN, labelled as follows: "Port Barton, great waterfall, 6.VII.1997, A. Zwick", holotype (SMNS); "Salakot Falls, Napsan side, 29-30.VI.1997, A.Zwick, MV-lamp (125W)", allotype (AOC), eight paratypes; "Napsan, Mt. Salakot, 20.VII.1998, 330m" (no collector named), four paratypes. Deposition of paratypes: 1 ♀ AOC; 1 ♂, 2 ♀♀ FCC; 4 ♂♂, 4 ♀♀ PSC.

Remarks. The discovery of this new species from Palawan Island is particularly interesting as it is a significant biogeographical range extension for the genus. Although politically belonging to the Philippines, Palawan I. lies on the Bornean shield and thus is biogeographically more closely aligned with Borneo.

STEM 6

Large, long-legged beetles (13.5-17.0 mm). Above, head and prothorax shiny black; eyes salient, globose, anterior orbital seta set in a deep fovea; antennomere 5 subequal to, or shorter than 4; labrum with 13 to 28 submarginal and discal setae. Mandibles with 3rd pre-apical incisor of left mandible and the 2nd and 3rd of the right mandible broadened into cutting blades; anterior blade of the left 3rd pre-apical incisor with a concave edge. Prosternum clothed with erect decorative setae. Elytra dull black, usually with a greenish or bronzy tint, each elytron with a typical pattern of six separate rounded dots; female elytral mirror spot large, glossy black. Apices of elytra more or less obliquely truncate, more rounded in females; elytral suture armed with small tooth in male and a well developed mesally directed spine in female (spines cross when elytra are closed). Abdominal sterna almost entirely densely clothed with long white recumbent setae. Aedeagus with a radically hooked apex which, in repose, points to the right (sufficient to separate males from all other *Thopectica* males).

KEY TO SPECIES OF STEM 6

- Size less than 14.5 mm. Labrum with 13-20 setae *conspicua*
- Size greater than 15.0 mm. Labrum with 20-28 setae (rarely fewer)
. *perconspicua*

21. *Thopectica (Thopectica) conspicua* (Schaum) (fig. 22 a-d)

Cicindela conspicua Schaum, 1862: 176 ["Luzon"]. Schaum, 1863b: 66. Chaudoir, 1865: 24. Atkinson, 1889: 6. W. Horn, 1892: 76; 1905: 33; 1908-15: 280, 283, 285; 1923: 363; 1926: 163; 1930: 4; 1931: 4; 1938: pl. 47, figs. 23-24. Schultze, 1916: 7. Kano, 1931: 170. Miwa, 1931: 2. Mandl, 1964: 90.

Cicindela acalanthi Dohrn i.l. (= *conspicua* Schaum). Dokhtouroff, 1887: 151. Horn, 1915: 285.

Cicindela conspicua var. *minor* Chaudoir, 1865: 24 ["Luçon"]. W. Horn, 1893: 345 ["v. *minor* Chd. existirt nur in litteris, bei derselben Art fehlt das Synonym: *Acalanthi* Dohrn i.l. Dokht. (Bull. Belg.)"].

Thopectica? conspicua v. *minor* Chaudoir. Fleutiaux, 1892: 132. Heyne, 1894: 30.

Cylindera (Thopectica) conspicua (Schaum). Schilder, 1953: 547.

Diotophora conspicua (Schaum). Rivalier, 1961: 137. Wiesner, 1980: 125.

Thopectica (Thopectica) conspicua (Schaum). Cassola, 1991: 521. Wiesner 1992: 171. Lorenz, 1998: 51.

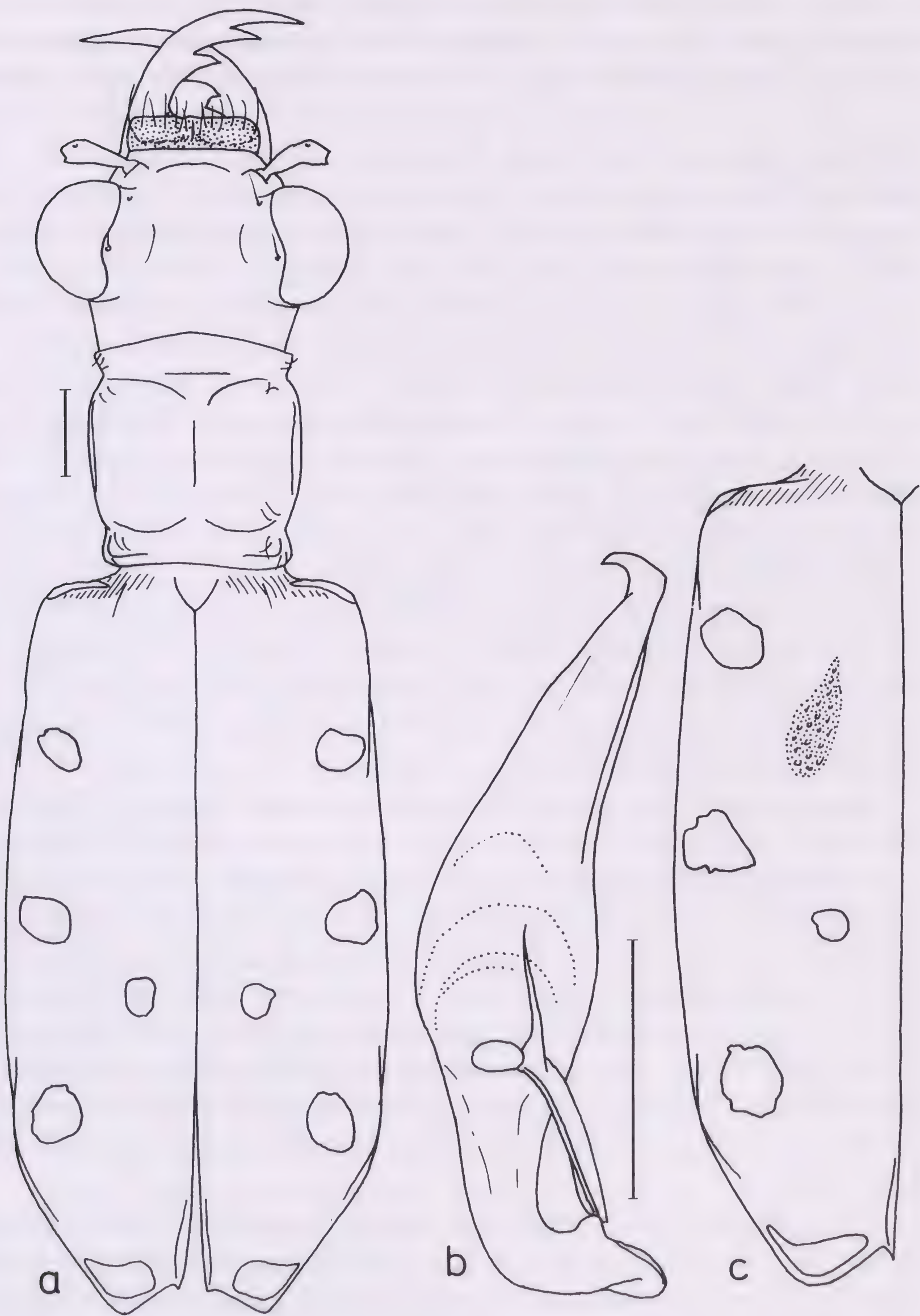


Fig. 22 - *Thopeutica* (*Thopeutica*) *conspicua* (Schaum, 1862). Lectotype ♂ (ZMB): a. habitus, b. aedeagus; ♀ from "Manilla" (FCC): c. left elytron. Scale-lines: 1 mm.

Type Specimens. SCHAUUM (1862) failed to indicate a type specimen, however from his description it is clear that he examined both sexes and that these were collected by Semper. The ZMB collection contains two specimens (♂, ♀) from the Semper collection. One additional pair, also collected by Semper, as well as a female specimen from the Bonvouloir collection (bearing a red printed label "Type"), are in the RMNH collection. The ZMB collection additionally contains a male specimen labeled "Enolia m., Ins. Philipp." (yellow label, obviously handwritten by H.R. Schaum) and one pair from the Schaum collection. The first ZMB male specimen, bearing a large rectangular yellow label ("conspicua/Schaum/Luzon/ Semper"), is considered to be the holotype and is here designated as the species lectotype. The other seven specimens which are presumed to have been seen by H. Schaum are considered to be paralectotypes. Most other specimens in these and other collections previously considered to be *conspicua* actually belong to the following new species, described below. However, the names *enolia* Schaum ("nomen in litteris") and *acalanthi* Dohrn ("nomen nudum") appear to apply to specimens belonging to the same species as *conspicua*, and consequently they are unavailable.

Specimens examined. Thirty-nine specimens (including lectotype and 7 paralectotypes).

Diagnosis. Length: 13.5-14 mm (without labrum). Until now *conspicua* was thought to be the largest of the genus in the Philippines, however the discovery that it is a dual species led to a re-definition of the species. Based on the examination of Schaum's type specimens, *conspicua* was found to be smaller in size, with a shorter pronotum, proportionally shorter elytra, larger elytral spots with the discal dot obliquely placed more behind the middle marginal one, a narrower female black mirror and a much smaller, slightly differently shaped male aedeagus. Moreover, the sculpture of the head is finer, especially between the eyes, and the labrum has 20 or fewer submarginal and discal setae.

Redescription. *Head* with surface distinctly and finely striate on vertex with deep, parallel striae mesad of the eyes and on genae; behind eyes and on neck transversely rugose. Head somewhat shiny black to bronze-black with purple or blue-green reflections mesally on clypeus, frons and vertex; antennal plates and anterior part of genae metallic green, usually with golden or bluish reflections; clypeus partly to wholly metallic.

Antennae rather short, reaching approximately the first third of the elytral length; scape metallic green, antennomeres 2-4 bronze-black, nearly glabrous with two to three spiniform setae on 2 and 3, 5 shorter than 4, 5-11 dark rufous-brown.

Mouthparts. Labrum short and transverse, violaceous-black to dark rufous, nearly four times wider than long, sinuate anteriorly with a distinct protruding medial tooth; 15-20 long submarginal setae both near margin and on disc. Mandibles testaceous in the basal half, mesally with some metallic green reflections and rufous-black anteriorly and on preapical incisors. Maxillary and labial palpi testaceous, with the last two palpomeres of the former and the last of the latter more or less metallic green.

Prothorax. Pronotum subsquare, slightly longer than wide, subparallel; pronotal disc smooth and glabrous, each corner of the pronotum (at anterior constrictions and around postero-lateral angles) with clusters of recumbent white setae (or pits where abraded). Black to bronze-black with metallic luster; metallic blue-green in anterior and posterior transverse grooves; anterior and posterior collars and the postero-lateral angles metallic blue-green to violet. Propleura clothed with decumbent setae along the pleuro-sternal suture and over the remainder of ventral half with long, white, dorsally directed recumbent setae; blue-green to violet-black. Prosternum setose, metallic blue-green.

Pterothorax. Mesepisterna of male shallowly excavated with band of decumbent setae along mesopleural suture and ventrally, smooth, metallic green to blackish-green; of females, mostly smooth, glossy black, often with some violet or coppery reflections. Coupling sulcus (female) consisting of a deep pit above the middle of the mesepisternum. Mesepimera and metepisterna densely clothed with white setae; mesosternum mostly glabrous except for postero-lateral corners; metasternum (except for central disc) densely setose.

Elytra wider than width of head across eyes, slightly convex laterally, less than three times as long as the pronotum; dull matte blackish-green, except at extreme base where they are shiny, and distad of the apical lunule where they are narrowly cuprous in most specimens. In most females the glossy basal area extends down the sides of the elytra, from the humeral dot toward the sub-humeral one. Female mirror spot glossy black, relatively small, oval-shaped, strongly punctate, slightly oblique, situated some distance from the

suture. Elytral maculation consisting of six spots: humeral (within the glossy basal area), sub-humeral, marginal, discal (obliquely placed well behind the marginal dot), sub-apical and apical (transverse, slightly comma-shaped). Apex of elytra more or less obliquely truncate, more rounded in females; suture armed with small tooth in male and a longer obvious spine in female (spines cross when elytra are closed). Epipleura dark bronze with violet reflections.

Legs. Coxae densely clothed with recumbent white setae. Trochanters ferruginous, remainder of legs metallic dark bronze with violaceous to cuprous reflections.

Abdomen. Abdominal sterna densely clothed with white recumbent setae, especially laterally, visible sterna 3-5 each with one or two pairs of long tactile submarginal setae; sterna golden-green with coppery reflections.

Aedeagus relatively long (5.0-5.2 mm), fusiform, slightly arcuate, widened and bulbose before the middle, then gradually narrowed toward the apex (both in lateral and dorso-ventral aspects), terminating in a strong, slightly curved, dorsally projecting apical hook.

Distribution. Philippines Islands: Luzon I. (Kalinga Apayao, Mountain Pr., Benguet, Laguna). Reported, most certainly erroneously, from Kôtôsho, Taiwan (MIWA, 1931; KANO, 1931).

LOCALITY LABEL DATA. PHILIPPINES: "Philippines, Ch. Semper [*printed*]; Ex coll. Bonvouloir [*printed*]; Museum Leiden, collectie A.E. Kerkhoven [*printed*]", paralectotypes (1 ♂, 1 ♀ RMNH). "42460 [*printed*]; Enolia m., Ins. Philipp. [*yellow label, manuscript by H. Schaum*]", paralectotype (1 ♂ ZMB). "Hist.-Coll., Nr. 42460, Ins. Phillipin. [*sic!*], Coll. Schaum [*handwritten*]", paralectotypes (1 ♂, 1 ♀ ZMB). "Phil., conspicua Sch." (1 ♂ ZMB). "Geilenkenser, Ins. Philipp." (1 ♂, 1 ♀ DEI). "Philippinen; coll. O. Leonhard" (1 ♂ DEI). "Ins. Philipp.; Cicindela conspicua Schm., det. K. Mandl 1969" (1 ♂ ZMB). "Philip-pinae [*handwritten*]; Ex. coll. Bonvouloir [*printed*]; Museum Leiden, collectie A.E. Kerkhoven [*printed*]; conspicua Schaum, Philippinae [*handwritten*]; type [*red printed label*]", paralectotype (1 ♀ RMNH). "Philip-pinae; Ex. coll. Bonvouloir; Museum Leiden, collectie B. H. Klynstra" (1 ♂ RMNH). "Philippinae; Museum Leiden, collectie A.E. Kerkhoven" (1 ♀ RMNH). "C. acalanthis/Philipp., Dhn coll." (1 ♂ CMNH). "Dohrn, Ins. Phil.; Museum Leiden, Cicindela acalanthis, det. Dohrn" (1 ♀ RMNH). "Phil.[ippine] Isl." [*printed*] (1 ♂, 2 ♀ ♀ BMNH). "Phillip. [*sic!*] Islands [*printed*]; Fry Coll. 1905-100 [*printed*]; Cicindela conspicua Schaum, Ins. Philipp. [*handwritten by H. Schaum*]" (1 ♀ BMNH). "Phillip. [*sic!*] Islands [*printed*]; Fry Coll. 1905-100 [*printed*]" (1 ♂ BMNH). "Philippines; ex coll. Dokht., enolia Schaum; Coll. W. Horn" (1 ♀ DEI). "Ins. Philip.; W. Horn, Philippin.; conspicua Sch.; Coll. O. Leonhard" (1 ♀ DEI). "Filippine, Acq. Deyrolle, 1870" (1 ♂ MSNG). "Philippines" (1 ♂ MZLU). LUZON: "conspicua Schaum, Luzon, Semper" [*yellow, rectangular, handwritten label*], lectotype (1 ♂ ZMB). "Hist.-Coll., Nr. 39945,

Luzon, Semper [*handwritten*]", paralectotype (1 ♀ ZMB). "Luzon, conspicua Schaum" (1 ♂ FCC). "Luzon, Meyer" (1 ♂ DEI). KALINGA APAYAO: "Luzon, Kalinga Subprovince, near Balbalin" (HORN, 1923: 363). MOUNTAIN PROV.: "Payambugan, Mt. Prov., P.I., VII.9.31 [*printed*]; F.C. Hadden Collection [*printed*]" (1 ♂, 1 ♀ ITZ). BENGUET: "Baguio, Benguet, Baker" (1 ♀ DEI; 1 ♂, 1 ♀ USNM; 1 ♂ FCC). LAGUNA: "Manilla, ex coll. Dohrn" (1 ♀ FCC; 1 ♂ MZLU). UNKNOWN ORIGIN: "Harris Coll., Staudinger & Bang Haas" (1 ♂ MCZ). "E. Indies [*printed*]; Ex cab. Thomson; 7; Luçon, conspicua Schaum; C. conspicua Schm. (Dr. W. Horn); F. Bates Coll., 1911-248" (1 ♀ BMNH). No data (1 ♂ MZLU).

Remarks. In the revised, restricted sense adopted in this review, only a few old specimens appear to be referable to *conspicua* and no exact localities are known from more recent material. However, since both *conspicua* and the following species were found in the Semper's series of specimens, it is probable that the two species may sometimes occur syntopically. The last recorded collection date for *conspicua* is 1931.

22. *Thopeutica (Thopeutica) perconspicua* n. sp. (fig. 23 a-d)

Diagnosis. Length: 15.5-17.0 mm (without labrum). *Th. perconspicua* is the largest species of the genus in the Philippines and has been confused with *conspicua* in most collections. However, despite the strong general resemblance, it is easily discernable from *conspicua* by its larger size, longer, more rectangular pronotum, proportionately longer elytra, longer elytral apices, smaller elytral spots (with the discal and marginal dots nearly aligned in a same row), the larger black mirror spot of the female and the much larger and slightly differently shaped male aedeagus. Labrum usually with 20 or more submarginal and discal setae.

Description. *Head* with frons distinctly and finely striate in a concentric pattern; deep, parallel striae mesad of eyes; vertex and neck with surface more coarsely rugose, occasionally becoming shallow to nearly effaced, especially posteriorly. Clypeus, frons and vertex black with purple reflections; antennal plates, clypeus (laterally) and at the anterior corners of the genae metallic green with metallic golden or bluish highlights.

Antennae rather short, reaching approximately the first third of the elytral length; scape metallic green, antennomeres 2-4 bronze-black, nearly glabrous, with two to three spiniform setae on 2 and 3, 5 subequal to or shorter than 4, 5-11 dark rufous-brown.

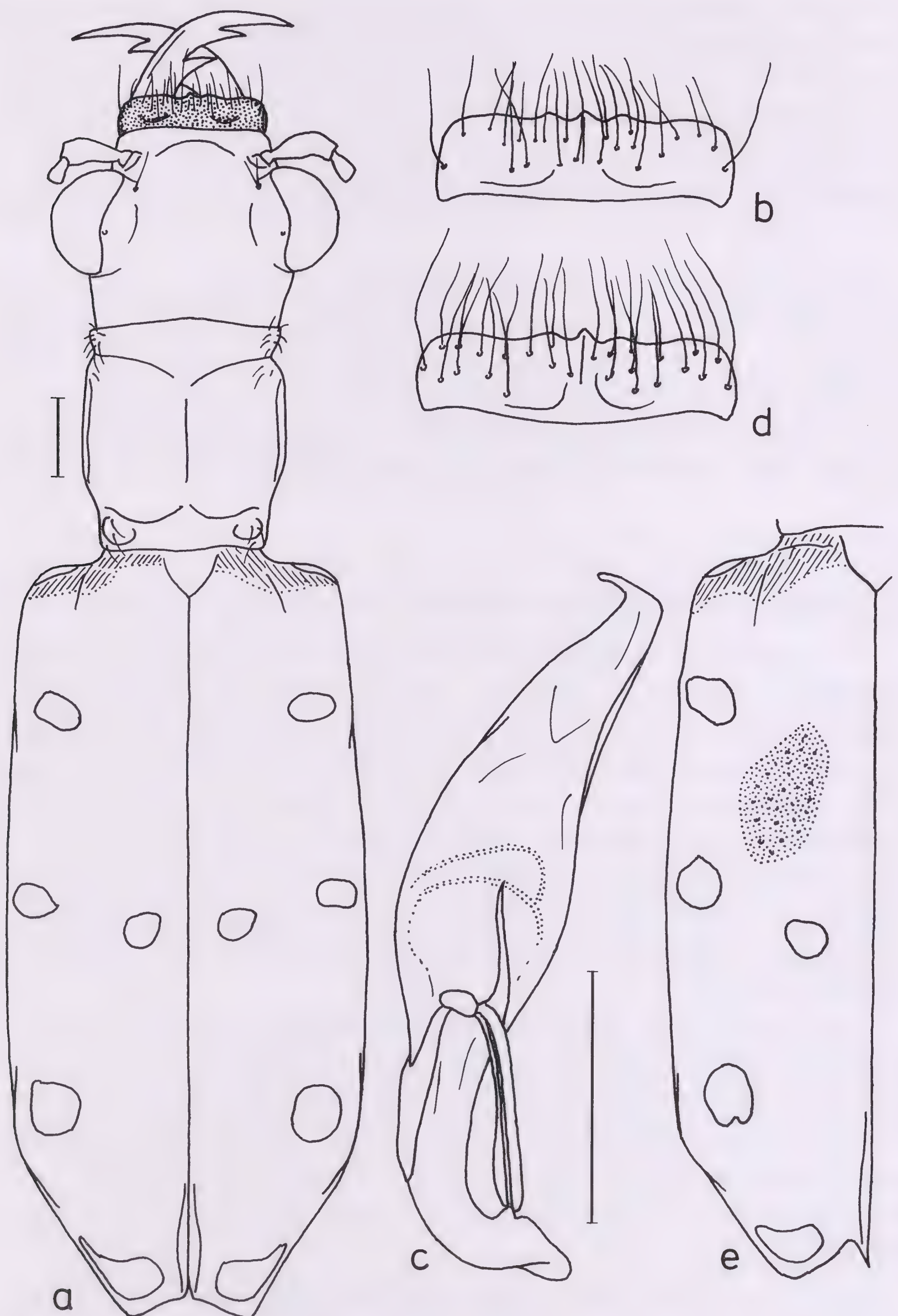


Fig. 23 - *Thopeutica (Thopeutica) perconspicua* n. sp. Paratype ♂ from "Imugan, Luzon" (FCC): a. habitus, b. aedeagus; paratype ♀ from "Jackmal Bunhian, 24 km E Mayoyao, Ifugao prov." (FCC): d. left elytron. Scale-lines: 1 mm.

Mouthparts. Labrum short and transverse, violaceous-black, over four times wider than long, dorsally with longitudinal ridge or carina, anteriorly sinuate with a distinct protruding median tooth; 20-28 long submarginal and discal setae (17 on one ex.). Mandibles testaceous at base, metallic green mesally, rufous-black anteriorly and on inner teeth. Maxillary and labial palpi testaceous, with the last two palpomeres of the former and the distal one of the latter more or less metallic green.

Prothorax. Pronotum subrectangular, distinctly longer than wide, laterally sub-parallel, smooth, with coarse shallow transverse wrinkles on disc; metallic bronze-black with greenish or violet reflections, blue-green in the transverse grooves. Pronotal disc glabrous, each corner of the pronotum (at anterior constrictions and around postero-lateral angles) with clusters of recumbent white setae. Proepisterna violet-black, smooth and glabrous in the upper half, ventral half with long, erect white setae. Prosternum punctate with long, erect setae.

Pterothorax. Mesepisterna of male shallowly excavated, mostly smooth, metallic cuprous-green, variably clothed with dorsally directed recumbent setae (especially along the mesopleural suture). Mesepisterna of female broadly excavated, glossy black with some violet or coppery reflections, clothed with a narrow strip of white decumbent setae along the mesopleural suture and continuing onto the postero-lateral corner of the prosternum; coupling sulcus consisting of a large, deep pit posteriorly positioned beneath the epipleuron of the elytral base. Mesepimera, metepimera, metepisterna, lateral margins of mesosternum and nearly entire metasternum densely clothed with white setae.

Elytra wider than width of head across eyes, slightly convex laterally, approximately three times as long as the pronotum; dull, matte blackish-green, except at extreme base where they are shiny and distad of the apical lunule where they are narrowly cuprous in most specimens. The glossy basal area of most females extends down the sides of the elytra, from the humeral dot towards the sub-humeral dot. Female mirror spot metallic black, larger than that of the preceding species, oval-shaped, narrowed anteriorly, distinctly punctate, with slightly oblique placement some distance from the suture. Elytral maculation consisting of six spots: humeral (within the glossy basal area), sub-humeral, marginal, discal, sub-apical and apical (transverse, slightly comma-shaped). The alignment of discal and marginal dots is

nearly transverse (e.g., the four dots - both elytra - form a shallow, transverse arc). Apex of elytra obliquely truncate, more rounded in females; suture rounded or armed with a small tooth in male; with a strong obvious spine in female (spines tend to cross when elytra are closed). Epipleura dark bronze with violet reflections.

Legs. Coxae densely clothed with recumbent white setae; trochanters pitchy, rufous; remainder of legs metallic dark bronze with violaceous to cuprous reflections.

Abdomen. Abdominal sterna covered with white recumbent setae except mesally; visible sterna 3-5 each with two pairs of long tactile submarginal setae; sterna golden-green with coppery or bluish reflections.

Aedeagus relatively quite long (6.2-6.5 mm), fusiform, slightly arcuate, widened and bulbose in the middle, then gradually narrowed toward the apex (apex nearly flattened in dorso-ventral aspect), ending in a strong, dorsally pointed hook.

Etymology. The name of this new species is chosen because it is strongly reminiscent of *Th. conspicua*, however larger and stronger.

Distribution. Philippine Islands: Luzon I. (Mountain Pr., Ifugao, Benguet, Nueva Vizcaya, Laguna).

Type Specimens. Holotype, allotype and 209 paratype specimens, labeled and deposited as follows: PHILIPPINES: "Phil. [handwritten]" (1 ♂, 1 ♀ BMNH). "Philippines [handwritten]; enolia Schm., ex coll. Dokht. [handwritten]; Coll. W. Horn, DEI Eberswalde [printed]" (1 ♂ DEI); *with additional yellowish handwritten W. Horn label*: "conspicua Schm." (1 ♀ DEI). "Collected by R. McGregor [printed]; Acc. No. 1275, Lot Govt. Lab. Coll. [printed]" (1 ♂ DEI). "Philip. [printed]; Sammlung Cl. Müller [printed]; ex coll. C. v. Nidek [printed]" (1 ♂ ITZ). "Philippin. V.1986 [handwritten]" (1 ♀ FCC). "Philipp. [handwritten]" (1 ♀ MCZ). "Phil. [handwritten]; 236 [printed]" (1 ♀ MCZ). "Dohrn, Ins. Phil. [handwritten]; Museum Leiden [printed], Cicindela conspicua Schaum [handwritten]" (1 ♂ RMNH). "Ins. Philip. [printed]; Coll. W. Horn, DEI Eberswalde [printed]" (1 ♂, 1 ♀ DEI). "42729 [handwritten]; Phillip. [sic!] Islands [printed]; Fry Coll., 1905-100 [printed]" (1 ♀ BMNH). "Phillipine [sic!] Is. [handwritten]" (1 ♂ BMNH). "Philippines [printed]" (1 ♂ RNC). "Harris Collection [printed], Phill. [sic!] Is. [handwritten], determ'd by W. Horn, Chas. Fuchs Coll. n. 108 [printed]" (1 ♂ AMNH). "Harris Collection, Staudinger & Bang Haas [printed]; Alan S. Nicolay Coll. [printed]" (1 ♂ AMNH). "Harris Collection [printed], Philippines [handwritten], Luetgens Coll. No. 1018 [printed]" (1 ♂ MCZ). "Filippine, Acq. Deyrolle, 1870 [handwritten]" (1 ♂, 1 ♀ MSNG). "Filippine, D. Dohrn, 1871 [handwritten]" (1 ♂, 1 ♀ MSNG); *same, but*: "1872" (1 ♂ MSNG). LUZON: "Harris Collection, specially determ'd by Walther Horn [printed], Luzon [handwritten], Deut. Ent. Mus. [printed]" (1 ♂ MCZ). "Luzon [handwritten], Thop. conspi/cua Sch. tp. [handwritten]" (1 ♂ ZMB). "Hist.-Coll., Nr. 39945, Luzon, Semper

[*handwritten*]" (1 ♀ ZMB). "39945 [*printed*]; Hist.-Coll., Nr. 39945, Luzon, Semper [*handwritten*]" (1 ♀ ZMB). "Luzon [*handwritten*]; Museum Leiden, collectie A.E. Kerkhoven [*printed*]" (1 ♀ RMNH). "Luzon [*handwritten*]; Coll. O. Leonhard [*printed*]; *conspicua* Sch., var. [*handwritten by H. Schaum?*]" (1 ♂, 1 ♀ DEI). "Luçon, Meyer [*handwritten by W. Horn?*]; Coll. W. Horn, DEI Eberswalde [*printed*]" (1 ♂ DEI). "Luzon, Philippines, ex W.Horn [*handwritten*]; Wickham Collection 1933 [*printed*]" (1 ♀ USNM). "Luçon [*handwritten by W. Horn?*]; coll. Baden Ruge [*handwritten*] (1 ♂ FCC). "Luçon [*handwritten*]; Andrewes Bequest., B.M. 1922-221 [*printed*]" (1 ♂ BMNH). MOUNTAIN PROV.: "Philippines: Mountain Prov., Abatan, Buguias, 60 km S of Bontoc, 1800-2000m, 1.VI.1964; H.M. Torre Villas, light trap, Bishop" (16 ♂♂, 7 ♀♀ BPBM; 3 ♂♂ FCC). "Philippines, N. Luzon, Mt. Province, 27.V.1986, leg. R.M. Lumawig" (5 ♂♂, 2 ♀♀ JWC). "N-Luzon, Mount. Province, 7.86" (1 ♂, 1 ♀ KWC). "Mt. Province, N. Luzon, Phil., VII.1988" (1 ♂, 1 ♀ HSC; 1 ♂, 1 ♀ ITZ). NUEVA VIZCAYA: "Philippinen, Luzon [*printed*], Imugan [*handwritten*]" (*on reverse*: S. Boettcher, 6.1917 [*handwritten*]), holotype (1 ♂ ZMB), allotype (1 ♀ ZMB), paratypes (10 ♂♂, 2 ♀♀ ZMB; 2 ♂♂ FCC); *with additional label*: "Collection of Frederick Allen Eddy [*printed*]" (1 ♀ MCZ); *with additional label*: "Museum Leiden, collectie A.E. Kerkhoven [*printed*]" (1 ♂ RMNH); *with additional labels*: "Thopeutica *conspicua* Schm., acq. Staudinger [*handwritten*]; Museum Leiden, Ex coll. B.H. Klynstra" (1 ♀ RMNH); *with additional labels*: "810 [*printed*]; Field Mus. (F. Psota Coll.) [*printed*]; *Cic. conspicua* Schaum [*handwritten by K. Mandl*], det. Dr. Ing. K. Mandl, 1959 [*printed*]" (1 ♀ FMNH: MANDL 1964: 90). "Imugan, Luzon [*printed*]!" (1 ♂ FCC). "Philippinen, Luzon [*printed*], Imugan [*handwritten*]; Calder Collection [*printed*]" (1 ♂ UMIC). IFUGAO: "Philippines, Ifugao Province, Jacmal Bunhian, 24 km E Mayoyao, 800-1000m, 25-27.IV.1967; H.M. Torre Villas collector, Bishop Museum" (31 ♂♂, 12 ♀♀ BPBM; 9 ♂♂, 4 ♀♀ FCC; 3 ♂♂, 3 ♀♀ CMNH). "P.I.: Luzon, Mt. Prov., Ifugao, Mayoyao, 1000-1500m, 4-6.VII.1966; H.M. Torre Villas collector, Bishop Museum" (15 ♂♂, 7 ♀♀ BPBM; 4 ♂♂ FCC; 1 ♂ AOC). "Philippines, Ifugao Prov., Liwo, 8 km E Mayoyao, 1000-1300m, 21-30.V.1967; H.M. Torre Villas collector, Bishop Museum" (2 ♂♂, 8 ♀♀ BPBM; 1 ♂, 1 ♀ FCC; 1 ♀ CMNH). "Philippines, Luzon, Ifugao pr., 20 km S. Banaue, 14.VI.1989, R. Naviaux [*printed*]" (3 ♂♂ RNC). BENGUET: "Botanical Garden, Baguio, Philippines, 1970.VII.8, M. Sato leg." (1 ♂, 1 ♀ MHC). "Philippines, Luzon, Benguet pr., Atok, 12.VI.1989, R. Naviaux" (1 ♂, 1 ♀ RNC). "Baguio & vic., Mt. Prov., Luzon, P.I., 4000-7400 ft, June-Sept. '45, PJD [P.J. Darlington, Jr.] [*printed*]" (1 ♂ MCZ). LAGUNA: "Majayjay, Laguna, Luzon, P.I. [*printed*], June 17 '28 [*handwritten*]; Colln R.C. McGregor [*printed*]" (1 ♂ USNM; *with additional label*: "*Cicindela conspicua* Schaum, Dr. W.Horn det., 1935" (1 ♀ USNM). "Luzon, Laguna Pr., Mc Gregor [*printed*], Paete [*handwritten*]; *conspicua* Schaum, det. W. Horn 1935" (1 ♂ USNM). "Luzon, Laguna Pr., Mc Gregor, Ube, Mt. Banahao [*printed*]; *Cicindela conspicua* Schm., Dr. W. Horn det., 1931" (1 ♂ USNM). UNKNOWN ORIGIN: "E. Indies [*printed*]; F. Bates Coll., 1911-248 [*printed*]" (1 ♂ BMNH). No data (1 ♂ ZMB).

Remarks. Since both *conspicua* and *perconspicua* were found in the series of specimens collected by Semper, it is probable that the two species co-exist syntopically. This would strengthen our assumption that the two are specifically distinct and reproductively isolated.

Subgenus **Philippiniella** nov. subg.

Body shape short, somewhat globose; males generally smaller than females. Head with dense, coarse striae; antennal plates smooth and shiny. Mandibles relatively short and stout; teeth broad at bases; pre-apical incisors subequal in length and tending to be evenly spaced; third incisor of both mandibles with rounded anterior edge; mandibles of males with white “spot” greatly expanded over dorsal surface. Maxillary palpi with palpomere 1 fuliginous and 2-4 bright metallic. Labial palpomeres 1-2 pale, 3 dark and metallic. Pronotum dorsally globose (generally more pronounced in males), postero-lateral angles small to nearly absent; prosternum glabrous. Elytral maculation of a generally transverse pattern. Females without a well defined, glossy elytral mirror spot; when indication of mark is present at the mirror locus, then it is poorly defined or degenerate, not glossy. Elytral apices microserrulate; sutural spine small to nearly absent. Visible abdominal sternum 1 and occasionally 2 or 2-3 with a narrow clump or band of recumbent white setae at the lateral margins; remainder of abdominal sterna glabrous or with at most fine, recumbent, short setae.

Type species: *Cicindela clara* Schaum.

KEY TO SPECIES OF *PHILIPPINIELLA*

- 1a. Head and pronotum coarsely and deeply rugose; elytra granulate-punctate, punctuation deepest over basal half but extending to apex; female usually, but not always, with a shiny metallic green remnant of the mirror spot. Median lunule composed of two dots. Head and prothorax bright metallic green, elytra dark green to purplish-green *rugothoracica*
- 1b. Disc of pronotum coarsely but shallowly rugose, pronotum tending to be glossy in appearance; punctuation of basal half of elytra fine to moderate, shallow to absent over distal third. Elytra of female without clear remnant of mirror spot. Colour variable 2
- 2a. Head and pronotum cuprous, elytra dark gray with median dots forming transverse line *aenula*

- 2b. Head and pronotum deep blue-green to purplish-blue; elytra with apical half sericeous, similarly colored. Median dots united or not 3
- 3a. Median dots united to form a transverse line; colour tending towards green *clara*
- 3b. Median dots separate; colour tending toward purple or deep blue *suavissima*

23. *Thopeutica (Philippiniella) clara* (Schaum) (fig. 24 a)

Cicindela clara Schaum, 1860: 181, pl. 3, fig. 3 ["Luzon"]. Schaum, 1863b: 66. Chaudoir, 1865: 21. Baer, 1886: 98. Atkinson, 1889: 6. Fleutiaux, 1892: 39. Heyne, 1894: 30. W. Horn, 1892: 76; 1905: 33; 1915: 249, 286; 1924b: 88; 1926: 163; 1931: 5; 1938: pl. 48 (fig. 16). Schultze, 1916: 7.

Cylindera (Thopeutica) clara (Schaum). Schilder, 1953: 547.

Diotophora clara (Schaum). Rivalier, 1961:137. Wiesner, 1980: 125.

Thopeutica (Thopeutica) clara (Schaum). Cassola, 1991: 522. Wiesner, 1992b: 171. Lorenz, 1998: 51.

Type Specimens. Despite the fact that SCHAUM (1860) based his description on both sexes ("♂ et ♀"), just a single female specimen was found in the ZMB collection which bears a large yellow label "clara Schaum/Luzon" (handwritten by H. Schaum) and the accession number label "42163". This specimen is herein-designated lectotype. Other specimens in ZMB either bear a different accession number or are obviously later accessions, thus they are not considered to be part of the type series.

Specimens examined. One hundred and thirty-seven specimens (including lectotype).

Diagnosis. Length: 8.5-10.2 mm (without labrum). Head and pronotal disc blue-violet with blue-green margins, elytra dull black basally with green to bluish-green reflections on the distal half. Pronotum subsquare, dorsally convex, wrinkled on disc, postero-lateral angles small. Maculation composed of a small humeral (often comma-shaped) dot, a larger subhumeral transverse spot, a long transverse narrow middle band (situated before the middle), a very small subapical dot (sometimes lacking) and a small apical comma-shaped spot. Aedeagus fusiform, short and squat, with a short, blunt apex.

Redescription. *Head* golden- to bluish-green, with stronger blue-violet reflections around eyes, clypeus and genae. Surface rugose,

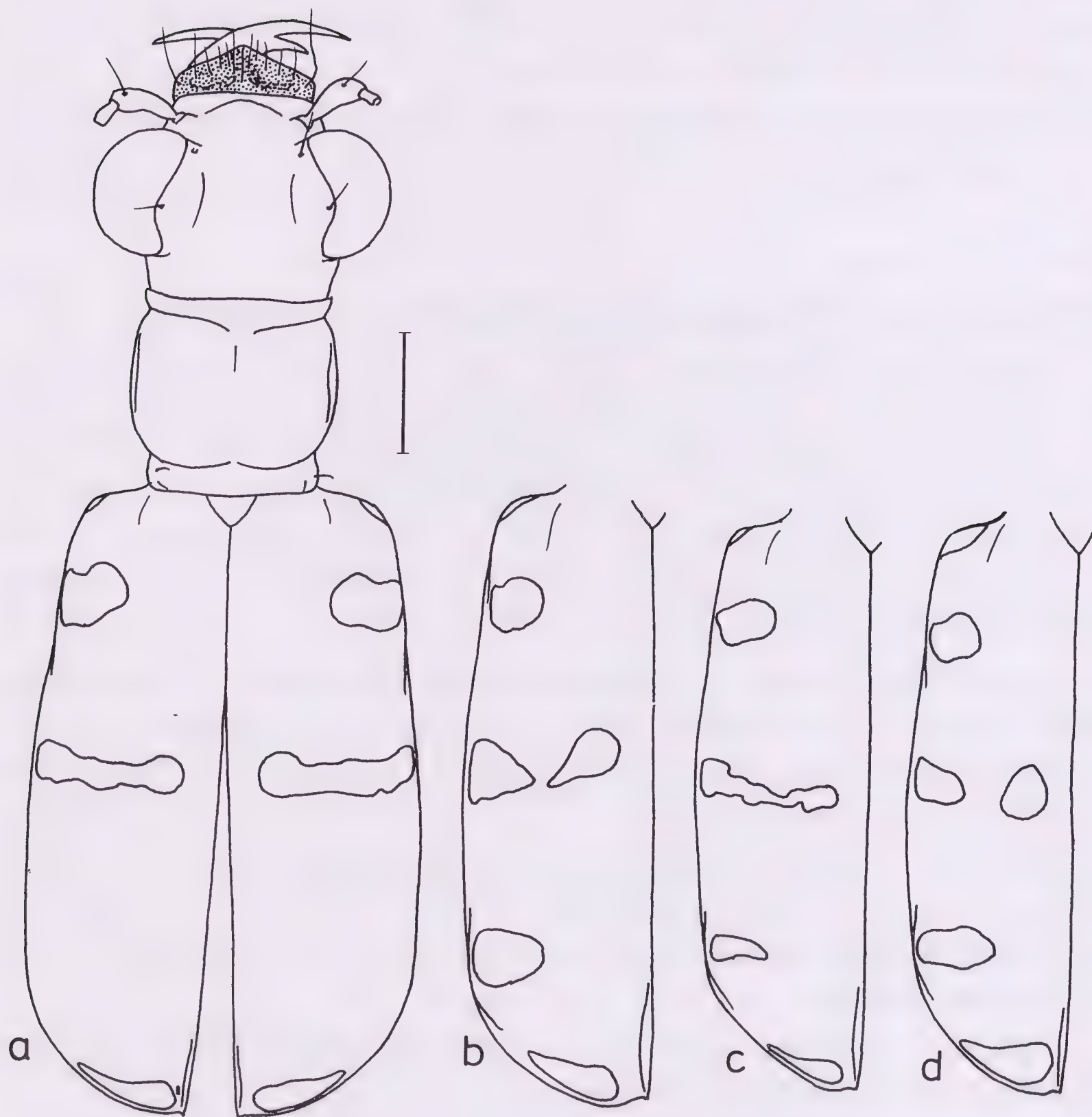


Fig. 24 - *Thopeutica* (*Philippiniella* nov.) *clara* (Schaum, 1860): ♂ from "Tayabas, Quezon Park" (FCC): a. habitus; *Th. (Ph.) suavissima* (Schaum, 1862): ♂ from "Sierra Madre, Quezon" (FCC): b. left elytron; *Th. (Ph.) aenula* (W. Horn, 1905): ♂ from "Mt. Makiling, Luzon" (FCC): c. left elytron; *Th. (Ph.) rugothoracica* (W. Horn, 1907): ♂ from "Kiangnan, Ifugao, Luzon" (FCC): d. left elytron. Scale-line: 1 mm.

frons with dense, fine vermiculate striae in a weak concentric pattern; vertex with dense, broken pattern of somewhat transverse striae blending into coarse transverse linear striae on sides of head and neck; coarser longitudinal striae appearing around eyes and on genae.

Antennae slender, relatively short, reaching approximately the first third of the elytra; scape and antennomere 2 metallic bluish-green, antennomeres 3-4 metallic greenish-bronze with violaceous reflections, nearly glabrous, 5 subequal to 4, 5-11 dark rufous to blackish brown.

Mouthparts. Labrum subtriangular in shape, strongly produced anteriorly, about two to two and one-half times wider than long, subcarinate from median tooth nearly to the clypeus, metallic violaceous-black with green to violet reflections laterally; median tooth acutely protruding anteriorly, 9-10 long submarginal setae and 2-3 discal setae near the median carina. Labrum of males with median tooth less pronounced than in females. Mandibles testaceous for basal two-thirds, then briefly metallic bluish-green, dark rufous apically and on pre-apical incisors. Maxillary palpi tinged with dark metallic green, the ultimate palpomere bright metallic bluish-green; labial palpi testaceous, with ultimate palpomere metallic bluish-green.

Prothorax. Pronotum subsquare (slightly narrowed behind), approximately as long as wide, laterally subparallel, dorsally moderately globose; disc unevenly, shallowly wrinkled, anterior and posterior collars transversely striate, postero-lateral angles small to nearly lacking. Colour blue-green on margins, blue-violet on disc; smooth and mostly glabrous, just a few white setae (most often abraded) on postero-lateral angles. Propleura smooth, dark bluish-green to violet, with erect, white setae over front half and ventrally near the procoxae.

Pterothorax. Mesepisterna glossy violaceous-black to metallic golden-green with white setae over ventral half. Coupling sulcus (female) consisting of a deep pit within a dorso-ventral depression of the mesepisternum just ventral to the epipleuron of the elytral base. Mesepimera, posterior corners of metepisterna, and lateral margins of metasternum clothed with recumbent white setae. Metepisterna and sterna metallic blue-green with golden or violaceous reflections.

Elytra relatively short, globose, enlarged behind, wider than width of head across eyes, slightly rounded laterally; dull black with green to

bluish-green reflections on the posterior half; female without trace of elytral mirror spot. Elytral maculation basically six-spotted: a minute humeral dot (most often pointed distally), a large post-humeral dot (transverse, curved towards scutellum), a narrow transverse middle band basad of the middle (terminating at, but still connected to a rounded discal dot near the suture), a very small, narrow, pre-apical dot (occasionally broken-up or entirely absent) and a transverse apical spot. Apex of elytra evenly rounded, very slightly retracted; sutural spine very short, sharp, in both sexes. Epipleura dark rufous to violaceous-bronze.

Legs. Anterior sides of pro- and mesocoxae, and lateral margins of metacoxae clothed with recumbent white setae. Trochanters testaceous to rufous, basal half of femora bluish-green, remainder of legs metallic dark bronze to violaceous.

Abdomen. Abdominal sterna punctato-setose, with a few scattered fine white recumbent setae; laterally, first visible sternum (and to a lesser extent sterna 2 and 3) with thick white decumbent setae; venter metallic blue-green with golden to violaceous reflections.

Aedeagus fusiform, short and stout, with a small, blunt, slightly hooked apex.

Distribution. Philippine Islands: Luzon I. (Zambales, Laguna, Quezon, Camarines Sur, Albay).

LOCALITY LABEL DATA. PHILIPPINES: "clara, Philippines [*handwritten*]; Donckier [*printed*]; Cic. clara Schm. [*handwritten by W. Horn*]; Dr. W. Horn det. 1923 [*printed*]" (1 ♀ BMNH). "Philipp. [*handwritten*]" (1 ♀ FCC). "Philippines, Concepción, II.1975 [*handwritten*]" (1 ♀ FCC). "5 Sept. 63, rec. RGC, Gapan, Nueva Ecija, Phillipines [*sic!*] [*handwritten*]; A.C. Allyn, Acc. 1969-20 [*printed*]" (1 ♂ FMNH). LUZON: "42163 [*printed*]; Clara Schaum, Luzon [*yellow rectangular label, handwritten by H. Schaum*]", lectotype (1 ♀ ZMB). "Luzon [*handwritten*]; 82513 [*printed*]; coll. H.C. Vogel [*printed*]; clara Schaum [*handwritten by H. Schaum?*]" (1 ♀ ZMB). "Luzon [*handwritten*]" (1 ♀ ZMB). "Luçon, Thompson [*yellow label, handwritten*]; 87381 [*printed*]" (1 ♀ ZMB). "Luçon, Laglaize, D. Oberthür '76 [*handwritten*]; Cic. (Thopeutica) clara Schaum [*handwritten*], teste R. Gestro [*printed*]" (2 ♂♂, 2 ♀♀ MSNG). "Philippinen, Luzon [*printed*], Lamac (?) [*handwritten*]" (1 ♀ ZMB). "Central plains of Luzon Is., II-IX.1945, Darlington" (2 ♂♂, 1 ♀ MCZ). ZAMBALES: "Olongapo, Zambales, Luzon, 9.11.07, Banks [*handwritten*]; Acc. No. 7575, Lot, Bu. of Sci., P.I. [*printed*]" (1 ♂ DEI). LAGUNA: "Manilla [*handwritten*]; Coll. Baden Ruge [*handwritten*]; C. clara Schm. [*handwritten by W. Horn*], Dr. W. Horn det. 1923 [*printed*]; Museum Leiden, Ex coll. B.H. Klynstra [*printed*]" (1 ♂ RMNH). "Manilla [*handwritten*]; Coll. Baden Ruge [*handwritten*]" (1 ♂ DEI; 1 ♀ FCC). "Luçon, Bilucio la Laguna [*handwritten*]; Coll. W. Horn, DEI Eberswalde [*printed*]; Clara Schm. [*yellowish label handwritten by W.*

Horn]" (1 ♂ DEI). "L. Laglaize 1875, Biluca La Laguna, Luzon (Philippines) [*printed*]; Ex coll. Bonvouloir [*printed*], Museum Leiden, Collectie A.E. Kerkhoven [*printed*]" (2 ♀♀ RMNH). "L. Laglaize 1875, Biluca La Laguna, Luzon (Philippines) [*printed*]; Sharp Coll., 1905-313 [*printed*]; *Cicindela clara* Schaum [*handwritten*]; *Cicindela cla/ra* Schm. [*handwritten by W. Horn*], Dr. W. Horn det. 1922 [*printed*]" (1 ♂ BMNH). "*Cicindela clara*, Biluca La Laguna 1875, Ins. Phil. [*handwritten*]; Sharp Coll., 1905-313 [*printed*]" (1 ♂ BMNH). QUEZON: "Philippines, 12.60, Atimonan, Quezon [*handwritten*]" (1 ♂ FCC). "Quezon Park, Hadden, 1.6.32 [*handwritten*]" (1 ♀ DEI). "Quezon Park, Tayabas, Luzon, P.I. [*printed*], VI.19.31 [*handwritten*]; F.C. Hadden Collector [*printed*]" (1 ♀ DEI). "Quezon Park, Tayabas, P.I., Alt. 1000 ft. [*printed*], VI.1.31 [*handwritten*]; F.C. Hadden Collector [*printed*]" (1 ♂ ITZ). "Malinao, Tayabas, Baker [*printed*]; 5420 [*handwritten*]; Coll. W. Horn, DEI Eberswalde [*printed*]" (1 ♂ DEI). "Malinao, Tayabas, Baker [*printed*]" (1 ♀ USNM; 1 ♂ FCC). "Baler, Quezon, VI.1967, A. Concepcion, Glaser Collection" (2 ♂♂, 2 ♀♀ CMNH; 1 ♀ FCC). "Quezon Park, Tayabas, alt.1000ft, 5.VI.32, F.C. Hadden Collection" (29 ♂♂, 20 ♀♀ BPBM; 10 ♂♂, 16 ♀♀ AMNH; 7 ♂♂, 6 ♀♀ FCC); *with additional label*: "Lucban, Tayabas, R.C. McGregor" (3 ♂♂, 2 ♀♀ USNM). CAMARINES SUR: "Iriga, Camarines Sur, S. Luzon, 16.VI.1932, F. C. Hadden collector" (1 ♀ BPBM). ALBAY: "Albay Prov., Mt. Mayon (volc.), 16 km NW of Lagaspi, 900-1000m, 7.V.1962, H.M. Torre Villas" (3 ♂♂, 1 ♀ BPBM; 1 ♂, 1 ♀ FCC).

Remarks. A description of larvae referred to the present species (*clara*) was recently given by PUTCHKOV (1997), based on specimens collected by F.C. Hadden, May 1932, on Mt. Santo-Tomas (Mt. Pavany [=Mt. Paoay?], 2000-6500ft) (in DEI collection). We suggest that the larva described is actually the closely allied *Th. (Ph.) rugothoracica* (W. Horn, 1907) (see below), since Hadden collected adults of this species at the same locality and date. More significantly, there are no adult records of *clara* (or *aenula*) from Mountain Province, and only a single record for *suavissima* from this province (without elevation data).

24. *Thopeutica (Philippiniella) suavissima* (Schaum), revised status (fig. 24b)

Cicindela clara var. *suavissima* Schaum, 1862: 176 ["Philippinischen Inseln"]. Schaum, 1963b: 66. Chaudoir, 1865: 21. Atkinson, 1889: 6.

Cicindela suavissima Schaum. Fleutiaux, 1892: 39. Heyne, 1894: 30.

Cicindela clara suavissima Schaum. W. Horn, 1893: 333; 1905: 33; 1915: 286; 1926: 164; 1938: pl. 48 (fig. 17). Schultze, 1916: 7.

Cylindera (Thopeutica) clara suavissima (Schaum). Schilder, 1953: 547.

Diotophora clara suavissima (Schaum). Rivalier, 1961: 137. Wiesner, 1980: 125.

Thopeutica (Thopeutica) clara suavissima (Schaum). Wiesner, 1992b: 171. Lorenz, 1998: 51.

Type Specimens. Type series deposited in Berlin Museum (ZMB). A female specimen with large yellow label, "var./suavissima/Schaum/Lucon" [handwritten by Schaum] and the accession number label "42164", is herein designated as the species lectotype. Three specimens, two males and one female, with labels and accession number, "Luzon, coll. Schaum, Hist.-Coll. Nr. 42464", are designated paralectotypes. Additionally, a female specimen in the DEI collection, labeled, "Schaum, Luzon, Typ.!, Mus. Berol." [apparently handwritten by W. Horn], is considered to be a paralectotype because of its provenance, being from the Berlin Museum and from Schaum's type series. A female specimen in RMNH, labelled "Luçon; Ex coll. Bonvouloir; de Chaud. type; Museum Leiden, collectie A. E. Kerkhoven", and also bearing a red printed label "type", is not considered as part of the type series.

Specimens examined. Forty-seven specimens (including lectotype and four paralectotypes).

Diagnosis. Length: 8.7-10.2 mm (without labrum). Head and pronotum metallic blue-green to violet, elytra sericeous, black with violaceous reflections on the distal half. Pronotum narrowed posteriorly and dorsally globose, shallowly wrinkled over disc. Elytral markings composed of a small humeral dot, a larger rounded subhumeral spot, a middle lateral spot (transverse to somewhat triangular), a rounded disconnected discal dot (lateral and discal dots of both elytra arranged transversely), a large transverse subapical spot and a large apical comma-shaped spot. Aedeagus fusiform, short, stout and swollen dorsally with a short blunt and rounded apex.

Redescription. *Head* with surface rugose, with rather strong vermiculate striae on frons (in a clear concentric pattern) and vertex; posteriorly, and on neck striae becoming transverse; striae around eyes deep, parallel and longitudinal; genae with striae deep and parallel. Head metallic blue-green to violet, with more intense blue-violet reflections around eyes, on antennal plates and genae.

Antennae slender, relatively short, reaching approximately the basal third of the elytral length, slightly shorter in females; scape and antennomere 2 metallic bluish-green, antennomeres 3-4 metallic greenish-bronze with violaceous reflections (each with 1-2 setae mesally, and 2 apical setae), 5 subequal to 4 in length, 5-11 rufous-brown to black.

Mouthparts. Labrum about two and one-half to three times wider than long; greenish-bronze with blue to violet reflections, longitudinally subcarinate from median tooth nearly to the clypeus; mesally tridentate, median tooth acute, lateral teeth weakly defined; 7-8 submarginal long setae near anterior margin and 2-3 discal setae near the median ridge. Mandibles with basal half testaceous then briefly tinged with metallic bluish-green, apical half and preapical incisors dark rufous. Maxillary palpi more or less tinged with dark metallic green, the terminal palpomeres bright metallic bluish-green; labial palpi testaceous, with terminal palpomere metallic bluish-green.

Prothorax. Pronotum narrowed posteriorly, approximately as long as wide, laterally subparallel, dorsally globose; disc mostly smooth (between shallow wrinkles), anterior and posterior collars transversely striated, postero-lateral angles small to nearly lacking. Pronotal disc glabrous, blue-violet, lateral margins and anterior and posterior collars blue-green; postero-lateral angles with just 2-3 white decumbent setae (or pits where abraded). Propleurae smooth, dark bluish-green to violet, with erect white setae along pleuro-sternal suture, over anterior half and ventrally near the procoxae.

Pterothorax. Mesepisterna glossy violaceous-black to metallic golden-green with a few white setae ventrally. Coupling sulcus consisting of a deep fovea in the middle of the mesepisternum, below the base of the elytral epipleural rim. Mesepimera, posterior corners of metepisterna and lateral margins of the metasternum with recumbent white setae. Metepisterna and sterna metallic blue-green with golden or violaceous reflections.

Elytra relatively short, globose, expanded distally, wider than width of head across eyes, slightly convex laterally; dull greenish-black over basal half, with bluish to violaceous metallic reflections over posterior half. Female without elytral mirror spot. Elytra six-spotted, composed of a small humeral dot, larger rounded subhumeral spot, middle spot (transverse to subtriangular), a rounded disconnected discal dot (with the same transverse alignment as the lateral spot), a large transverse subapical spot and a large apical, comma-shaped spot. Apex of elytra evenly rounded, very slightly retracted, sutural spine very short, small to nearly lacking (but, when present, sharp). Epipleura dark rufous to violaceous-bronze.

Legs. Anterior sides of pro- and mesocoxae, and lateral margins of metacoxae clothed with recumbent white setae. Trochanters dark

rufous to brown, basal half of femora bluish-green; remainder of the legs metallic dark bronze to deep violet.

Abdomen. First visible sternum with one to a few thick, white, decumbent setae at the lateral margins, other sterna feebly punctato-setose with a few scattered, fine setae; venter metallic blue- to golden-green with violaceous reflections.

Aedeagus fusiform, short, squat (slightly more swollen dorsally than that of *clara*), with a short and rounded blunt apex.

Distribution. Philippine Islands: Luzon I. (Mountain Pr., Laguna, Quezon).

LOCALITY LABEL DATA. PHILIPPINES: "Philippines [*handwritten*]" (1 ♀ FCC). "Bowring., 63-47 [*printed*], Cic. Clara suavissima Schm. [*handwritten by W. Horn*]; Dr. W. Horn det. 1922 [*printed*]" (1 ♂ BMNH). "Ex Musaeo Mniszech [*printed*]; Ex coll. Bonvouloir [*printed*]; suavissima Schaum, Luzon [*handwritten*]; Museum Leiden, collectie A.E. Kerkhoven [*printed*]" (1 ♀ RMNH). LUZON: "Luçon [*handwritten*]; Ex Coll. Bonvouloir [*printed*]; de Chaud., type [*handwritten*]; Museum Leiden, collectie A.E. Kerkhoven [*printed*]; type [*red printed label*]" (1 ♀ RMNH). "42164 [*printed*]; var. suavissima Schaum, Luçon [*yellow large label, handwritten by H. Schaum*]", lectotype (1 ♀ ZMB). "Hist.-Coll., Nr. 42464, Luzon, Coll. Schaum [*handwritten*]", paralectotypes (2 ♂♂, 1 ♀ ZMB). "Schaum, Luçon, typ.!, Mus.Berol. [*handwritten by W. Horn*]; Coll. W. Horn, DEI Eberswalde [*printed*]; suavissima Schaum [*yellowish label, handwritten by W. Horn*]", paralectotype (1 ♀ DEI). "Whitehead [*printed*]; N. Luzon [*handwritten*]; Phillip. [*sic!*] Islands [*printed*]" (1 ♂, 1 ♀ BMNH). "Baer [*handwritten by W. Horn?*]; N. Luzon [*handwritten*]; Whitehead [*handwritten*]" (1 ♀ DEI). MOUNTAIN PROV.: "Mt. Province, N. Luzon, Phil., July 1988 [*handwritten*]" (1 ♂, 1 ♀ ITZ). "Philippines, N. Luzon, Mt. Province, 27.V.1986, leg. R.M. Lumawig" (3 ♂♂, 3 ♀♀ JWC; 1 ♀ FCC); *same, but*: "7.86" (2 ♂♂, 1 ♀ KWC). "Mount. Prov., 5.86, Philip." (1 ♀ RNC); *with additional labels*: "8.VI.1987, Acciavatti Collection" (1 ♂, 1 ♀ CMNH). "Mountain Province, N-Luzon, 5.86" (2 ♀♀ WC); *same, but*: "7.86" (1 ♀ WC). LAGUNA: "Manila [*handwritten by W. Horn*]; coll. Baden Ruge [*handwritten*]" (1 ♀ DEI). "Paete, McGregor, 'Cic.Clara rugothoraci-ca W.H., Dr. W. Horn det. 1935' " (1 ♂ CMNH). QUEZON: "Quezon, Sierra Madre, IV.1978, A. Concepción, Glaser Collection" (8 ♂♂, 3 ♀♀ CMNH; 2 ♂♂ 1 ♀ FCC). "Quezon, Sierra Madre, IV.1978, A. Concepción" (1 ♂ FCC).

Remarks. Labrum is less produced anteriorly than in *clara* and aedeagus is slightly more swollen dorsally than found in *clara*. In some localities (e.g.: Manila) *suavissima* seems to occur sympatrically with *clara*, thus strengthening their recognition as two distinct species.

25. *Thopectica (Philippiniella) aenula* (W. Horn), new status (fig. 24c)

Cicindela clara ssp. *aenula* W. Horn, 1905: 33 ["Luçon et? Mindoro"]. W. Horn, 1907: 77; 1915: 286; 1926: 164; 1938: pl. 48 (fig. 18). Schultze, 1916: 7. Mandl, 1964: 90.

Cylindera (*Thopeutica*) *clara aenula* (W. Horn). Schilder, 1953: 547.

Diotophora clara aenula (W. Horn). Rivalier, 1961: 137. Wiesner, 1980: 125.

Thopeutica (*Thopeutica*) *clara aenula* (W. Horn). Wiesner, 1992b: 171. Lorenz, 1998: 51.

Type Specimens. Type data for this species are not referenced by DÖBLER (1973). There are three specimens of *Th. aenula* in the DEI collection which bear a red printed label "Syntypus" (of the kind usually used by W. Horn): one female and two males. The female, labeled, "Luzon; coll. Baden Ruge; Type! coll. W. Horn", and also bearing a yellowish rectangular label "f. aenula mihi [handwritten by W.Horn]", is herein designated lectotype; the males, one labeled "Mindoro ou Lucon; Donckier; Type! Dr. W. Horn" [thus explaining why Horn included reference to Mindoro (with a questionmark) in his description] and the other labeled "Mus. Paris, Philippines, Laglaize 1875; Type! Dr. W. Horn", are designated paralectotypes based on W. Horn's original designation.

Specimens examined. One hundred and thirty-six specimens (including lectotype and two paralectotypes).

Diagnosis. Length: 8.0-9.6 mm (without labrum). Head and pronotum mostly metallic cupreous-red (disc), pronotal margins and transverse grooves shiny metallic bluish-green to green. Pronotum subsquare with very shallow wrinkles on disc, postero-lateral angles small to absent. Elytra dull black except at base which is metallic shining green. Elytral maculation composed of a small humeral dot, a rounded to transverse post-humeral dot, a long, transverse, narrow middle band (placed before the middle), a rather large, transverse, pre-apical dot and a transverse, comma-shaped, apical spot. Aedeagus fusiform, short and squat, with a short blunt apex.

Redescription. *Head* with surface rugose; frons with striae showing a clear concentric pattern, vertex and region behind eyes with coarse vermiculate striae, somewhat finer at back of head and on neck, deep parallel and longitudinal striae around eyes and on genae. Head mostly metallic cuprous-red; clypeus, antennal plates, sides of vertex and around eyes bluish-green; genae metallic blue-green, posteriorly violet.

Antennae slender, relatively short, reaching approximately the front first third of the elytral length; scape and antennomere 2 dark metallic bluish-green, antennomeres 3-4 metallic bluish-bronze with violaceous reflections, nearly bare, 5 subequal to 4, 5-11 dark rufous to blackish-brown.

Mouthparts. Labrum subtriangular, about two to two and one-half times wider than long, less strongly produced anteriorly than in *clara*, metallic violaceous-black with bluish-green reflections laterally, subcarinate from median tooth to middle of disc, the median tooth acutely protruding forward; 8-9 submarginal long setae near forward edge and 2-3 discal setae near the median carina. Mandibles with proximal two-thirds testaceous, apical third and preapical incisors rufescent, slightly tinged with metallic green in between. Maxillary palpi tinged with dark metallic violaceous-green, the terminal palpomere bright metallic green; labial palpi testaceous, with terminal palpomere metallic green.

Prothorax. Pronotum subsquare, approximately as long as wide, glabrous, laterally subparallel, moderately globose (dorsally); anterior and posterior collars transversely striate, disc relatively smooth with shallow, uneven wrinkles; postero-lateral angles small to nearly absent with one to two white setae (or pits when abraded). Disc and collars cuprous-red, lateral margins and transverse grooves blue-green. Propleura smooth, dark bluish-violaceous to bronze, with erect, white setae along the pleuro-sternal suture.

Pterothorax. Mesepisterna setose (a few white, decorative erect setae) ventrally and posteriorly; glossy violaceous-black with slight metallic golden-green highlights and ventrally. Coupling sulcus consisting of a deep fovea in the middle of the mesepisternum, beneath the epipleural rim. Mesepimera, posterior corners of the metepisterna and lateral margins of the metasternum clothed with recumbent white setae. Metepisterna and sterna metallic blue-green with golden reflections.

Elytra relatively short, slightly convex laterally, broader than width of head across eyes; dull black with some slight metallic luster behind; base, from scutellum to humeral dots, shiny metallic green. Female without any elytral mirror spot. Elytra typically six spotted: a small (may be minute or absent) humeral dot in both sexes, a larger post-humeral dot (rounded to subsquare, slightly transverse), a narrow transverse middle band (basad of the midline and ending at, but always connected to, a small rounded discal dot near the suture), a large, transverse, pre-apical dot, and a large, transverse, comma-shaped, apical spot. Apex of elytra evenly rounded, very slightly retracted, sutural spine very short, sometimes nearly effaced. Epipleura dark rufous to greenish-bronze.

Legs. Anterior side of pro- and mesocoxae, and lateral margins of metacoxae clothed with recumbent white setae. Trochanters rufous, basal half of femora green to cuprous, remainder of legs dark bronze to deep violet.

Abdomen. Abdominal sterna with fine, scattered setae; laterally, first visible sternum (and to a lesser extent, sterna 2 and 3) with thick, white recumbent setae; venter metallic blue-green with golden to violaceous reflections.

Aedeagus fusiform, short, squat, with a short, blunt, rounded apex.

Distribution. Philippine Islands: Luzon I. (Laguna, Quezon); Mindoro I.?

LOCALITY LABEL DATA. PHILIPPINES: "Philippine Is., E.M. Ledyard, B.M. 1925-491 [*printed*]" (2 ♀♀ BMNH). "Mus. Paris, Philippines, Laglaize-1875 [*printed*]; Type! Dr. W. Horn [*printed*]; Syntypus [*red printed label*]", paralectotype (1 ♂ DEI). MINDORO/LUZON: "Mindoro ou Lucon [*handwritten by W. Horn?*]; Donckier [*printed*]; Type! Dr. W. Horn [*printed*]; Syntypus [*red printed label*]", paralectotype (1 ♂ DEI). LUZON: "Luçon [*handwritten by W. Horn*]; coll. Baden Ruge [*handwritten by W. Horn*]; Type! coll. W. Horn [*printed*]; Syntypus [*red printed label*]; f. aenula mihi [*yellowish label, handwritten by W. Horn*]", lectotype (1 ♀ DEI). "Luzon" (1 ♀ CMNH). "Hist.-Coll., Nr. 42463, Luzon [*handwritten*]" (1 ♂ ZMB). LAGUNA: "Mt. Makiling, Luzon, Baker [*printed*]" (1 ♂, 1 ♀ DEI; 1 ♀ JWC). "Mt. Makiling, Luzon, P.I. [*printed*], VI.12.32 [*handwritten*]" (1 ♀ RDWC). "Mt. Makiling, Luzon, P.I. [*printed*], VI.12.32 [*handwritten*]; F.C. Hadden Collection [*printed*]" (2 ♂♂ BPBM). "Mt. Makiling, Laguna, P.I. [*printed*], VI.1.31 [*handwritten*], 400 ft. elev. [*printed*]; F.C. Hadden Collector [*printed*]" (1 ♀ RMNH). "Mt. Makiling, Luzon, P.I., VI.1.32, 400'; F.C. Hadden Collection" (20 ♂♂, 13 ♀♀ BPBM; 3 ♂♂, 2 ♀♀ AMNH; 8 ♂♂, 6 ♀♀ FCC); *same, with date*: "11.V.1932" (1 ♂ BPBM, 1 ♀ FCC); *same, with label data*: "29.V.1931, F.C. Hadden Collector, Alan S. Nicolay Collection" (1 ♂, 2 ♀♀ AMNH); *same, with label data*: "19.V.1931, F.C. Hadden Collector" (1 ♂ CMNH); *with data label*: "24.V.1930, A. Duyag collr" (1 ♂ USNM); *with data label*: "12.VII.1932, J.F. Lawrence Collection" (1 ♀ MCZ). "Mt. Makiling, Luzon, Baker" (6 ♂♂, 5 ♀♀ USNM; 1 ♂ AMNH; 2 ♂♂, 2 ♀♀ FCC). "Mount Maquiling, S.Luzon, C.F. Baker" (1 ♂, 1 ♀ ANSP). "Mt. Makiling, Laguna, Luzon, VI.1.47, Elev. 2000-3000 ft, F.G. Werner leg. [*printed*]; CNHM-Philippine Zool. Exped. (1946-47), F.G. Werner leg. [*printed*]; second growth forest [*printed*]" (1 ♀ FMNH). "Mt. Banahao, VI.1914, Boettcher [*printed*]; Luzon [*printed*]" (2 ♂♂, 4 ♀♀ ZMB); *with additional label*: "Field Mus. (F. Psota Coll.)" (1 ♂ FCC); *same data, with additional label*: "clara aenula W. H., acq. Staudinger [*handwritten*]; Museum Leiden, Ex coll. B.H. Klynstra [*printed*]" (1 ♂, 1 ♀ RMNH); *with additional label*: "Museum Leiden, collectie A.E. Kerkhoven [*printed*]" (2 ♂♂ RMNH); *with additional label*: "Collection of Frederick Allen Eddy" (1 ♂, 1 ♀ MCZ); *same data on 'Calder Collection' label* (2 ♂♂ UMIC). "Mt. Banahao, P.I., Baker [*printed*]; 3012 [*handwritten*]; Museum Leiden Ex coll. B.H. Klynstra" (1 ♀ RMNH). "Mt. Banahao, Ube, Laguna Pr." (1 ♂ USNM). "Los Baños, Laguna, Luzon, VI.47, F.G. Werner leg. [*printed*]" (1 ♂ FMNH). "Los Banos, Philippine Ids. [*printed*], 600 ft, VII.10.21 [*handwritten*], F.X. Williams Collector [*printed*];

Hadden ded. [*handwritten by W. Horn?*]” (1 ♂ DEI). “Los Banos, P.I., Baker [*printed*]” (1 ♂, 1 ♀ DEI); with additional label: “10.VII.1921, X. Williams Collector” (1 ♀ AMNH). “Los Banos, P.I., 23.V.1953, Townes family” (1 ♂ CMNH). “Majayjay, Laguna, 5.VI.1928, R.C.McGregor” (1 ♂ USNM). “Paete, Luzon [*printed*]” (1 ♀ FCC; 1 ♂ ITZ); *with additional label*: “H.C. Fall Collection” (1 ♂ MCZ). “Luzon, Paete, VI.1916, G. Boettcher [*printed*]; Field Mus. (F. Psota Coll.) [*printed*]” (1 ♀ FMNH). “Philippinen, Paete 1919, O. Schültze [*printed*]” (1 ♀ DEI; 1 ♂ FCC). “Paete, Luzon, Filipiny, Coll. A. Adámek” (1 ♂ KWC). “Gorge Montalban, W. Schultze [*handwritten*]” (2 ♂♂, 1 ♀ DEI). “Philippines, Luzon, Laguna Pr., Pagsanjan, 17.VI.1989, R. Naviaux” (1 ♂, 2 ♀♀ RNC). QUEZON: “Candelaria, Tayabas, Luzon, P.I., VI.25.30 [*handwritten*]; F.C. Hadden Collector [*printed*]” (1 ♂ DEI); *with additional label*: “M.A. Cazier Collection” (1 ♂ AMNH); *same, but with data*: “F. Rivera, 21.VI.1930, R.C. McGregor” (1 ♂, 1 ♀ USNM). “Lucban, Tayabas, V.1926, R.C.McGregor” (1 ♂, 1 ♀ USNM).

Remarks. Label data indicate that this species has been taken in “second growth forest” at elevations between 2000 and 3000 feet (Mt. Makiling).

26. *Thopectica (Philippiniella) rugothoracica* (W. Horn), new status (fig. 24d)

Cicindela clara ssp. *rugothoracica* W. Horn, 1907: 77 [“Ins. Philipp. Coll. R. C. McGregor), Benguet, Irisan “]. W. Horn, 1915: 286; 1923: 363; 1926: 164; 1938: pl. 48 (fig. 19). Schultze, 1916: 7.

Cylindera (Thopectica) clara rugothoracica (W. Horn). Schilder, 1953: 547.

Diotophora clara rugothoracica (W. Horn). Rivalier, 1961: 137. Wiesner, 1980: 125.

Thopectica clara rugothoracica (W. Horn). Wiesner, 1992b: 171. Lorenz, 1998: 51.

Type Specimens. Type material not referenced by DÖBLER (1973). HORN (1907) indicated the depository of type specimens as follows: “Specimen alterum in coll. Bureau of Science, Manila, P.I., alterum in mea. Type ♀, No. 1515 in Entomological Collection, Bureau of Science, Manila”. Since the Bureau of Science collection was apparently destroyed during World War II, the male in the W. Horn collection (DEI) labeled: “Irigan, Benguet, Philipp. Ins. [*handwritten by W. Horn*]; Collected by R. McGregor [*printed*]; Acc. No. 1273, Lot Govt. Lab. Coll. [*printed*]; Type! Dr.W.Horn [*printed*]; Syntypus [*red printed label*]; f. rugothoraci-ca mihi [*yellowish label, handwritten by W.Horn*]” is herein designated lectotype. A female specimen in USNM, with same locality label as the lectotype, probably belonged to McGregor’s original series but is not considered in the type series because Walther Horn most likely never saw it.

Specimens examined. Seventy-five specimens (including lectotype).

Diagnosis. Length: 7.5-10 mm (without labrum). Head and pronotum metallic green (sometimes cupreous), with golden, bluish or cupreous reflections. Pronotum subsquare, disc densely wrinkled, postero-lateral angles small. Female mirror spot small and degenerate to completely absent. Elytra dull greenish-black, with strong green reflections on shoulders and on distal half. Maculation is composed of a humeral dot, rounded post-humeral dot, long and narrow transverse lateral spot (placed before the middle), rounded, disconnected discal spot (placed on the same transverse line as the preceding spot, but closer to the suture), narrow, transverse subapical spot, and large, comma-shaped, apical spot. Aedeagus fusiform, short, squat, with a short blunt apex.

Redescription. *Head* bright green, sometimes cuprous, with bluish- to cuprous reflections around eyes, on clypeus, frons and genae; violet on sides of neck. Surface very rugose, with dense, concentric vermiculate striae on frons, coarse vermiculate striae on vertex and posteriorly; neck with coarse, transverse striae; deeper, parallel longitudinal striae around eyes and on genae.

Antennae slender, relatively short, reaching approximately the basal third of the elytral length; scape and antennomere 2 metallic bluish-green, antennomeres 3-4 metallic violaceous-bronze, nearly glabrous, 5 subequal to or shorter than 4, 5-11 dark rufous to blackish-brown.

Mouthparts. Labrum two to two and one-half times wider than long, dark violaceous-bronze, with some cuprous to greenish reflections laterally, anteriorly produced and distinctly tridentate, median tooth acutely protruding; disc longitudinally subcarinate from median tooth back to middle; 9-10 long submarginal setae and 2-3 discal setae near the median carina. Mandibles with proximal half to two-thirds testaceous, apically tinged with dark metallic green; preapical incisors dark rufous to brown. Maxillary palpi more or less dark metallic, the terminal palpomere bright metallic green; labial palpi testaceous, terminal palpomere metallic bluish-green.

Prothorax. Pronotum broadest anteriorly, slightly wider than long, laterally subparallel, slightly restricted behind, dorsally moderately globose; disc and anterior and posterior collars with rather strong transverse wavy striae and wrinkles; postero-lateral angles small to

nearly lacking. Colour bright green, sometimes cuprous, with some slight bluish- to cuprous reflections; above, smooth and except for a few white setae or pits on postero-lateral angles, glabrous. Propleura smooth, dark greenish-bronze with bluish- to violaceous reflections; mostly glabrous except for a few erect white setae along the anterior margin, pleural-sternal suture and procoxae.

Pterothorax. Mesepisterna glossy, violaceous-black with metallic golden-green highlights; ventrally with a few white setae. Coupling sulcus (females) consisting of a sharply excavated mesepisternum with a deep pit posteriorly positioned ventral to the elytral humeral angle. Mesepimera, posterior corners of metepisterna and lateral margins of the metasternum with recumbent white setae. Metepisterna and sternum metallic golden- to bluish-green.

Elytra relatively short, globose, convexly expanded distally, wider than width of head across eyes; dull greenish-black, sub-matte, with slight metallic green shimmer on shoulders and especially towards apex, metallic green at base from scutellum to humeral dot. Female mirror spot small and degenerate to completely absent; when present, always metallic green and strongly punctate; situated mesally between the post-humeral dot and the suture. Maculation typically six-spotted: a humeral dot, rounded post-humeral dot, long and narrow transverse lateral spot (placed before the middle), a rounded but disconnected discal spot (situated on the same transverse line as the lateral spot but closer to the suture), a narrow, transverse subapical spot, and a large, comma-shaped, apical spot. Apex of elytra evenly rounded, very slightly retracted, sutural spine very small to absent. Epipleura dark rufous to metallic greenish bronze.

Legs. Anterior side of pro- and mesocoxae, and lateral margins of metacoxae clothed with recumbent white setae. Trochanters dark rufous to brown, basal half of femora bluish- to golden-green, remainder of the legs metallic dark bronze to violaceous.

Abdomen. Abdominal sterna punctato-setose, with a few scattered fine white recumbent setae; first visible sternum, and to a lesser extent sterna 2 and 3, laterally with thick white recumbent setae; venter metallic bluish- to golden-green.

Aedeagus fusiform, short, squat, with a short blunt apex.

Distribution. Philippine Islands: Luzon I. (Mountain Pr., Ifugao, Benguet, Nueva Vizcaya). Three specimens labeled "Mindanao, Zamboanga" (FCC, MCZ), are presumed to be mislabeled.

LOCALITY LABEL DATA. LUZON. MOUNTAIN PROV.: "Mt. Sto. Tomas, Mt. Prov., P.I. 7000 ft alt. [*printed*], V.26.1932 [*handwritten*]; F.C. Hadden Collection [*printed*]" (2 ♀♀ ITZ). "Mountain Prov., Abatan, Buguias, 60 km S of Bontoc, 1800-2000m, 27.V.1964, H.M. Torrevillas" (2 ♂♂, 8 ♀♀ BPBM; 1 ♂ FCC); *same, with date*: "4-7.V.1964" (1 ♂ FCC). "Mt. Sto. Tomas, 7000ft alt., 1.V.1931, F.C. Hadden Collection" (5 ♂♂, 2 ♀♀ BPBM; 1 ♀ FCC). "Hights Place, 7000 ft, 1.V.1932, F.C. Hadden Collection, Alan S. Nicolay Collection" (2 ♂♂ AMNH). "Mt. Santo Thomas, Hadden, 23.V.1932 [*handwritten by W. Horn*]" (1 ♂, 1 ♀ DEI). "Mt. Santo Thomas, 8000ft, 1.V.1931, F.C. Hadden Collection" (1 ♀ BPBM). "Luzon, P.I., Benguet, Santo Tomas [*printed*]" (1 ♀ DEI). "Mt. Prov., Baguio, 1.VII.1932, 6000ft, J.O. Perry, F.C. Hadden Collection" (1 ♀ BPBM). "Baguio, Philippines, G.G. Haslam; W. Robinson bequest 1929" (2 ♂♂, 6 ♀♀ USNM; 1 ♂ FCC). "Baguio, Phil. Is., W. Robinson, Harris Collection" (2 ♂♂, 2 ♀♀ MCZ). "Baguio, Luzon [*handwritten by W. Horn*]" (1 ♂ DEI). "Baguio, Luzon [*printed*]" (1 ♂ FCC, head missing). "Baguio, Benguet, Baker [*printed*]" (1 ♂, 1 ♀ DEI). "Near Baguio, Luzon, Philippines" (1 ♀ FCC). NUEVA VIZCAYA: "Philippinen, Luzon [*printed*], Imugan [*handwritten*]" (1 ♂, 2 ♀♀ DEI; 2 ♂♂, 3 ♀♀ ZMB). "Philippinen, Luzon [*printed*], Imugan [*handwritten*]; 812 [*printed*]; Cic. fugax Schaum [*handwritten by K. Mandl on 'Dr. Ing. K. Mandl 1959' det. label*] (1 ♂ FMNH) [this is probably the same specimen erroneously recorded by MANDL (1964) under "fugax Schaum"]. "Philippinen, Luzon [*printed*], Imugan [*handwritten*]; Museum Leiden, collectie A.E. Kerkhoven [*printed*]" (1 ♀ RMNH); *with additional label*: "Museum Leiden, ex coll. B.H. Klynstra [*printed*]" (1 ♂ RMNH); *with additional label*: "Collection of Frederick Allen Eddy" [*printed*] (1 ♀ MCZ); *same data on 'Calder Collection' label* (1 ♂ UMIC). "Imugan, Luzon, H.C. Fall Collection" (1 ♀ FCC). "Imugan, Luzon [*printed*]; ex coll. C. v. Nidek [*printed*]" (1 ♀ ITZ). IFUGAO: "Philippines, Luzon, Banawe 1450 m, 16.VI.1982, on walls of rice terraces, J. Margraf [*handwritten*]" (2 ♂♂ FCC) [cuprous pronotum!]. "Philippines, Luzon, Ifugao pr., 20 km S. Banaue, 14.VI.89, R. Naviaux" (1 ♂ RNC) [cuprous pronotum!]. "Philippines, Mt. Data, 13.VI.1989, R. Naviaux" (1 ♂ RNC). "Philippines, Luzon, Kiangnan-Ifugao, 1000 m, 10.VI.1981, J. Margraf; Mossy, rippling rocks" (1 ♂, 1 ♀ FCC) [cuprous pronotum!]. BENGUET: "Irisan, Benguet, Philipp. Ins. [*handwritten by W. Horn*]; Collected by R. McGregor [*printed*]; Acc. No. 1273, Lot Govt. Lab. Coll. [*printed*]; Type! Dr.W.Horn [*printed*]; Syntypus [*red printed label*]; f. rugothoraci-ca mihi [*yellowish label handwritten by W. Horn*]", lectotype (1 ♂ DEI). "Irisan, Benguet, Luçon; collected by R. McGregor; C. F. Baker collection, 1927; Acc. No. 1273, Lot Govt. Lab. Coll.; Cic.clara ru-gothoracica W. H., Dr. W. Horn det., 1925" (1 ♀ FCC). "Mt. Paoay, 2000', Hadden, 21.V.1932 [*handwritten*]" (2 ♀♀ DEI) ["Benguet Subprovince, Pauai (Haight's)": HORN 1923: 363]. MINDANAO?: "Zamboanga, Phil. Islds., Gift of B. P. Clark" (2 ♀♀ MCZ; 1 ♂ FCC) [*locality most probably erroneous!*].

Remarks. This species is the most distinctive of the group, being easily identified by the strong rugosity of the head and pronotum, structure of the coupling sulcus, presence of a degenerate elytral mirror spot and more or less uniform dorsal and ventral metallic green coloration. Apparently it is a montane species, as specimens have been collected from 1800-2000m (and 7000-8000ft.). HORN (1923) stated (after W. Schultze), that this species "runs and flies rapidly near damp places along roadsides". Label data on specimens examined indicate

habitat of “mossy, rippling rocks” and running on “walls of rice paddies”. PUTCHKOV (1997) has recently described a larva which he has referred to *clara*, but since the specimens had been collected by F.C. Hadden, in May 1932, on Mt. Santo-Tomas (Mt. Pavany [=Mt. Paoay?], 2000-6500ft), they are likely to belong, instead, to the present species (*rugothoracica*).

CONCLUSIONS

From the above mentioned results of the present study, 26 tiger beetle species occur in the Philippine Islands which appear to belong to the same genus *Thopeutica* Chaudoir (in Schaum, 1861) as *diana* Thomson, 1859, and allied species from Sulawesi, Indonesia. Unlike the sister genus *Wallacedela* Cassola, 1991, which appears to be a Sulawesi endemic, the genus *Thopeutica* (sensu Cassola, 1991) includes elements from both the Philippines (*Thopeutica* s. str., 22 spp.; *Philippiniella* nov., 4 spp.) and Sulawesi (*Thopeutica* s.str., 14 spp.; *Pseudotherates*, 19 spp.) (CASSOLA, 1991, 1997; WIESNER, 1992a; SAWADA & WIESNER, 1994; WERNER & WIESNER, 1997, 1999; MATALIN, 1998). A total of 58-59 species can presently be ascribed to *Thopeutica*, but it is likely that further specialized research, both in Sulawesi and in the many Philippine islands, will lead the field researcher to discover additional undescribed species. Unfortunately, it is also likely that many unknown species are going or have gone forever, due to the massive destruction of forest habitat in these heavily exploited and over-populated islands (COLLINS *et al.*, 1991).

It is interesting to notice that the genus *Thopeutica* has originated two separate endemic subgenera in each island group, the subgenus *Philippiniella* nov. in the Philippine Islands and the subgenus *Pseudotherates* Cassola, 1991, in Sulawesi. The latter one (19 species described so far) is especially interesting as it is characterized by an amazing “theratoid” facies which most certainly involves a kind of mimicry with the species of the unrelated, semi-arboreal tiger beetle genus *Therates* Latreille, 1817. The four known species of subgenus *Philippiniella* nov., on the contrary, only differ for their unusual body shape and characteristic elytral markings.

All other *Thopeutica* species, both from Sulawesi and the Philippine Islands, are, provisionally at least, considered to belong to the

same subgenus (*Thopeutica* s.str.), however it has to be emphasized that most Sulawesi species appear to be medium-sized to large, with females devoid or nearly devoid of well-marked mesepisternal coupling sulci, while all Philippine species (and moreover the species *stenodera* Schaum, 1861, *waltheri* Heller, 1897, *aurothoracica* Horn, 1897, and *whitteni* Cassola, 1991, from Sulawesi) are mostly small to medium-sized and moreover their females have distinct to deep coupling sulci. Further research may suggest the separation of the latter species into a distinct additional new subgenus, but, for the time being at least, we prefer to stay on the conservative side and to not further complicate the taxonomy of this group. However, there is no doubt that the general facies of most Philippine species (together with the four above mentioned Sulawesi species) strongly differ from that of most other Sulawesi species, the only exception being represented by the large species *conspicua* Schaum and *perconspicua* nov., which strongly recall some equally-sized Sulawesi species (such as *sawadai* Cassola, 1991, or *werneriana* Cassola, 1991) in the general facies, however differing from all other congeneric species because of their unusual apically-hooked male aedeagi.

A biogeographical analysis of the Philippines tiger beetle fauna (CASSOLA & WARD, 1996; CASSOLA & PEARSON, 2000) has shown considerable diversity, since 111 (over 85%) of the 130 known species appear to be Philippine endemics. ASHIDA (1994) listed 122 taxa, of which 97 (79.5%) are endemics. Not considering the island group of Palawan and Balabac, which belong to the Philippines politically but lie on the Bornean shield and basically are Bornean outputs, such an average grows even more. Moreover, the Philippines appear to be, despite their small land surface, the fifth richest country of the world in absolute number of tiger beetle species (km²/species ratio: 2,294) and very high in percent and absolute number of endemic species (fourth highest) (CASSOLA & PEARSON, 2000).

At the species level, only few species are common to the Philippines and to surrounding countries, and these are common, widespread species which occur on the Southeast Asian mainland as well. At the generic level, while all other genera which are represented in the Philippines are widespread Oriental genera (*Tricondyla*, *Therates*, *Dilatotarsa*, *Heptodonta*, *Lophyra* subgenus *Spilodia*), the only outstanding genus is *Thopeutica*, which appears to be endemic of the Philippines and Sulawesi only, thus a "Wallacean" endemic (VANE-

WRIGHT, 1990). *Thopectica* and its sister group *Wallacedela* Cassola, 1991, from Sulawesi, as it was suggested in a previous work (CASSOLA, 1991), are probably derived from an older (tropical Gondwanian?) faunal element which developed a considerable radiative speciation in the absence of competition from other faunal elements. The likely double origin of Sulawesi, which seems to have been formed from convergent eastern and western Gondwanian elements (AUDLEY-CHARLES, 1987; WHITMORE, 1981, 1987; HALL & BLUNDELL, 1996), would suggest the genus *Thopectica* to have developed in the western part (thus explaining its occurrence in the Philippines probably via links of the northern peninsula with the Sangihe and Talaud Islands), while *Wallacedela* could well have developed in the eastern part as a discreetly separate genus destined to retain its endemic status. Their close overall similarity in appearance may well be the result of subsequent convergence resulting from post-collision contact and competition.

ACKNOWLEDGMENTS

First, thanks are due to those colleagues and friends who kindly loaned materials from their institutions or personal collections, whose names are enumerated in the above list of collections. We give special thanks to several individuals who provided assistance in various ways, including Dr. Lothar Zerche (DEI), Dr. Fritz Hieke and Dr. Manfred Uhlig (ZMB), Dr. Terry L. Erwin (USNM), and Mr. Jürgen Wiesner (JWC), for loan of type specimens. We also thank Dr. Roberto Poggi, Director of the Museo Civico di Storia Naturale "G. Doria", Genova, Italy (MSTG), for his kindest help in publishing this paper in these "Annali", and Dr. Erwin (USNM) who provided museum space and equipment over a period of several years which enabled the junior author to accomplish much toward the completion of this study. Andreas Oesterle (Leutenbach, Germany) kindly provided the beautiful colour pictures of *Thopectica* habitat and live specimens given in figs. 26-29. Jürgen Trautner (Filderstadt, Germany) kindly provided the fine photograph of the habitat of *Th. milanae* (fig. 25). Herbert Zettel (Vienna, Austria) kindly helped in locating a difficult to find locality.



Fig. 25 - Habitat of *Thopeutica milanae* (Wiesner, 1992) at Leyte Island (Photo by J. Trautner, Filderstadt, Germany).



Fig. 26 - Habitat of *Thopeutica virginalis* (W. Horn, 1901) at Bohol Island: Condabong, 10 km NE Loboc, man-made forest, 12 December 2001 (Photo by A. Oesterle, Leutenbach, Germany).



Fig. 27 - Habitat of *Thopeutica virginalis* (W. Horn, 1901) at Bohol Island: 3 km SE Bilar, 13 December 2001 (Photo by A. Oesterle, Leutenbach, Germany).



Fig. 28 - ♂ specimen of *Thopeutica virginalis* (W. Horn, 1901) photographed at 3 km SE Bilar, Bohol Island, on 13 December 2001 (Photo by A. Oesterle, Leutenbach, Germany).



Fig. 29 - Mating pair of *Thopeutica virginalis* (W. Horn, 1901) photographed at 3 km SE Bilar, Bohol Island, on 13 December 2001 (Photo by A. Oesterle, Leutenbach, Germany).

REFERENCES

- ASHIDA H., 1994 - The Cicindelidae of South-east Asia - *Konchu to shizen*, 29 (2): 23-27 [In Japanese].
- ATKINSON E.T., 1889 - Catalogue of the Insecta of the Oriental Region. No. 1. Order Coleoptera, Family Cicindelidae - *Journ. asiatic Soc. Bengal*, Part II (Nat.Science), Calcutta, Suppl. 1: 1-24.
- AUDLEY-CHARLES M.G., 1987 - Dispersal of Gondwanaland: relevance to evolution of the Angiosperms (pp. 5-25) - In: T.C. WHITMORE (ed.), Biogeographical Evolution of the Malay Archipelago. Clarendon Press, Oxford.
- BAER G.-A., 1886 - Catalogue des Coléoptères des îles Philippines - *Annales Soc. ent. France*, Paris, (6) 6: 97-200.
- CASSOLA F., 1991 - Studi sui Cicindelidi. LXIII. I Cicindelidae (Coleoptera) dell'Isola di Sulawesi, Indonesia - *Annali Mus. civ. St. nat. "G. Doria"*, Genova, 88: 481-664.
- CASSOLA F., 1997 - Studies on Tiger Beetles. XCII. Further additions to the tiger beetle fauna of Sulawesi, Indonesia (Coleoptera, Cicindelidae) - *Doriana*, Genova, 6, n° 300: 1-7.
- CASSOLA F., 2000 - Studies on tiger beetles. CII. The Cicindelidae collected by Roland A. Müller in the Philippine Islands, with description of three new species (Coleoptera: Cicindelidae) - *Zool. Meded.*, Leiden, 73 (33): 491-509.
- CASSOLA F. & PEARSON D.L., 2000 - Global patterns of tiger beetle species richness (Coleoptera: Cicindelidae): their use in conservation planning - *Biol. Conserv.*, Rotterdam, 95: 197-208.
- CASSOLA F. & WARD R.D., 1996 - Biodiversity and biogeography of the tiger beetles (Coleoptera: Cicindelidae) of the Philippine Islands - *Proc. XX intern. Congr. Entom.* (Firenze, Italy, August 25-31, 1996), Abstract 02-026, 76.
- CHAUDOIR M., Baron de, 1865 - Catalogue de la collection de Cicindélètes de M. le Baron de Chaudoir - *Tip. Nys*, Brussels, 64 pp.
- COLLINS N.M., SAYER J.A. & WHITMORE T.C. (eds.), 1991 - The Conservation Atlas of Tropical Forests: Asia and the Pacific - IUCN, Macmillan Press Ltd, London and Basingstoke, 256 pp.
- DÖBLER H., 1973 - Katalog der in den Sammlungen des ehemaligen Deutschen Entomologischen Institutes aufbewahrten Typen. IX. Coleoptera Cicindelidae - *Beitr. Entom.*, Berlin, 23: 355-419.
- DOKHTOUROFF V.S., 1887 - Matériaux pour servir à l'étude des Cicindélides. IV. Note complémentaire et synonymique à la "liste des Cicindélides décrits postérieurement au Catalogue de Munich" de J. Demoor - *Annales Soc. entom. Belgique*, Bruxelles, 31: 149-158.
- ERWIN T.L. & HOUSE G.N., 1978 - A catalogue of the primary types of Carabidae (incl. Cicindelinae) in the collection of the United States National Museum of Natural History (USNM) (Coleoptera) - *Coleopt. Bull.*, Washington, 32: 231-255.
- FLEUTIAUX E., 1892 - Catalogue systématique des Cicindelidae décrits depuis Linné - Liège, Impr. H. Vaillant-Carmanne, 186 pp.

- HALL R. & BLUNDELL D. (eds.), 1996 - Tectonic Evolution of Southeast Asia - The Geological Society of London, London, Spec. Publ.106, xiii + 566 pp..
- HÄMÄLÄINEN M. & MÜLLER R.A., 1997 - Synopsis of the Philippine Odonata, with lists of species recorded from forty islands - *Odonatologica*, Bilthoven, 26 (3): 249-315.
- HEYNE A., 1894 - Systematisches und alphabetisches Verzeichnis der bis 1892 beschriebenen exotischen Cicindelidae - Verlag E. Heyne, Leipzig, 40 pp.
- HORN W., 1892 - Fünf Dekaden neuer Cicindeleten - *Deutsche entom. Zeitschr.*, Berlin, 36: 65-91.
- HORN W., 1893 - Bemerkungen und Nachträge zum "Catalogue systématique des Cicindelidae" par Fleutiaux (1893) - *Deutsche entom. Zeitschr.*, Berlin, 37: 321-347.
- HORN W., 1896a - Novae Cicindelidarum species ex coll. "Rotschild" - *Deutsche entom. Zeitschr.*, Berlin, 40: 149-152.
- HORN W., 1896b - Eine neue südamerikanische *Cicindela*. Verbesserung - *Deutsche entom. Zeitschr.*, Berlin, 40: 357-358.
- HORN W., 1900 - Zum Studium der Cicindeliden - *Entom. Nachrichtenbl.*, Troppau, 14: 214-218.
- HORN W., 1901 - De 7 novis Cicindelidis - *Deutsche entom. Zeitschr.*, Berlin, 45: 353-358.
- HORN W., 1905 - Systematischer Index der Cicindeliden - *Deutsche entom. Zeitschr.*, Berlin, 49, Suppl.: 1-56.
- HORN W., 1907 - A new subspecies of Philippine Cicindelidae - *Philipp. Journ. Sci.*, Manila, 2: 77-78.
- HORN W., 1915 - Coleoptera Adephaga, Fam. Carabidae, Subfam. Cicindelinae (pp. 209-486, pls. 16-23) - In: P. WYTSMAN (ed.), Genera Insectorum, Fasc. 82C, Bruxelles.
- HORN W., 1923 - Philippine species of the genus *Prothyma* and other Cicindelinae - *Philipp. Journ. Sci.*, Manila, 22: 357-363.
- HORN W., 1924a - On new and old Oriental Cicindelidae - *Mem. Dept. Agric. India, Entom. Series*, Calcutta, 8 (9): 89-91.
- HORN W., 1924b - Three new Cicindelidae from the Philippines - *Philipp. Journ. Sci.*, Manila, 24: 87-89.
- HORN W., 1926 - Carabidae: Cicindelinae - In: S. SCHENKLING (ed.), Coleopterorum Catalogus, W. Junk, Berlin., Pars 86: 1-345.
- HORN W., 1929 - Über einige orientalische und aethiopische Cicindelinae-Genera - *Entom. Nachrichtenbl.*, Troppau, 3 (1): 4-9.
- HORN W., 1930 - Beiträge zur Kenntnis neuer und alter Cicindelinen des Indo-papua-

- nischen Faunen-Gebietes - *Wien. entom. Zeit.*, Wien, 47: 1-9.
- HORN W., 1931 - Zwei neue Cicindelinen von Borneo und Celebes - *Entom. Nachrichtenbl.*, Troppau, 5 (1): 3-6.
- HORN W., 1938 - 2000 Zeichnungen von Cicindelinae - *Entom. Beih.*, Berlin-Dahlem, 5: 1-71, pls. 1-90.
- HORN W. & KAHLE I., 1935-37 - Über entomologische Sammlungen, Entomologen & Entomo-Museologie (Ein Beitrag zur Geschichte der Entomologie) - *Entom. Beih.*, Berlin-Dahlem, 2-4, pp. vi + 536, pls. I-XXXVIII.
- HORN W., KAHLE I., FRIESE G. & GAEDIKE R., 1990 - Collectiones entomologicae. Ein Kompendium über den Verbleib entomologischer Sammlungen der Welt bis 1960 - Akad. Landwirtschaftswiss. DDR, Berlin, 573 pp..
- DE JONG R. & TREADAWAY C.G., 1993 - The HesperIIDae (Lepidoptera) of the Philippines - *Zool. Verhand.*, Leiden, 288: 3-125.
- KANO T., 1931 - Coleopteran fauna of Kô tô sho - *Bull. biogeogr. Soc. Japan*, Tokyo, 2: 168-192 [In Japanese].
- KIBBY G., 1985 - A review of *Thopeutica*, a subgenus of *Cicindela* (Coleoptera: Cicindelidae), with a key to species and descriptions of two new taxa - *Journ. nat. Hist.*, London, 19: 21-36.
- LORENZ W., 1998 - Systematic list of extant ground beetles of the world (Insecta Coleoptera "Geadephaga": Trachypachidae and Carabidae incl. Paussinae, Cicindelinae, Rhysodinae). - Tutzing, 502 pp.
- MANDL K., 1964 - Ergebnisse einer Teilrevision des Cicindeliden-Materials des Chicago Natural History Museum - *Reichenbachia*, Dresden, 4 (12): 75-96.
- MATALIN A.V., 1998 - New data on the fauna of tiger beetles of Sulawesi (Coleoptera: Cicindelidae) - *Entom. Zeitschr. Insektenb.*, Frankfurt am Main, 108: 294-304.
- MEY W., 1999 - Report of the Philippine Workshop in Berlin 1998 - *Mitt. Mus. Nat.kd. Berlin, Zool. Reihe* 75: 337-339.
- MIWA Y., 1931 - A systematic catalogue of Formosan Coleoptera - Dept. Agric., Governm. Res. Inst., Taihoku, Formosa. Report No. 55, i-xiii, 1-4 [Not seen].
- PETERS J., 1994 - Philippines - a travel survival kit - Lonely Planet Publ., 5th edition, 521 pp.
- PUTCHKOV A.V., 1997 - Description of the larva of *Thopeutica clara* (Schaum, 1860) (Coleoptera, Cicindelidae) - *Zeitschr. Arb.-Gem. Österr. Entom.*, Wien, 49: 45-46.
- RAMMLMAIR D., 1993 - The evolution of the Philippine Archipelago in time and space: a plate-tectonic model - *Geol. Jahrb.*, Hannover, *Reihe B*, 81: 1-48.
- RIVALIER É., 1961 - Démembrement du genre *Cicindela* L. (suite). IV. Faune Indomalaise - *Rev. franç. Entom.*, Paris, 28: 121-149.
- RIVALIER É., 1971 - Remarques sur la tribu des Cicindelini (Col. Cicindelidae) et sa subdivision en sous-tribus - *Nouv. Rev. Entom.*, Toulouse, 1: 135-143.

- ROBINSON J.H. & MURRAY, R.R., 1980 - Abbreviated history and summary of the J.H. Robinson cicindelid collection and its transfer to R.R. Murray - *Cicindela*, St. Paul, 12: 25-27.
- SAWADA H. & WIESNER J., 1994 - *Thopectica (Pseudotherates) pseudopalauensis* n. sp., eine neue Art von Sulawesi (Coleoptera: Cicindelidae) - *Entom. Zeitschr. Insektenb.*, Essen, 104, 20: 410-412.
- SCHAUM H., 1860 - Beiträge zur Kenntniss einiger Laufkäfer-Gattungen. I. Die Cicindelen der Insel Luçon - *Berl. entom. Zeitschr.*, Berlin, 4: 180-182.
- SCHAUM H., 1861 - Eine Decade neuer Cicindeliden aus dem tropischen Asien - *Berl. entom. Zeitschr.*, Berlin, 5: 68-80.
- SCHAUM H., 1862 - Die Cicindeliden der philippinischen Inseln - *Berl. entom. Zeitschr.*, Berlin, 6: 172-184.
- SCHAUM H., 1863a - Beiträge zur Kenntnis einiger Carabiden-Gattungen - *Berl. entom. Zeitschr.*, Berlin, 7: 67-92.
- SCHAUM H., 1863b - Contributions to the Knowledge of the Cicindelidae of tropical Asia, containing Descriptions of new Species, a List of those hitherto described, and Synonymical Notes - *Journ. Entom.*, London, 2: 57-74.
- SCHILDER F.A., 1953 - Studien zur Evolution von *Cicindela* - *Wissensch. Zeitschr. Martin-Luther-Univers.*, Math.-Naturwiss. Reihe, Halle-Wittenberg, 3: 539-571.
- SCHULTZE W., 1916 - A catalogue of Philippine Coleoptera - *Philipp. Journ. Sci.*, Manila, 11: 1-8.
- TRAUTNER J. & SCHAWALLER W., 1996 - Larval morphology, biology and faunistics of Cicindelidae (Coleoptera) from Leyte, Philippines - *Trop. Zool.*, Firenze, 9: 47-59.
- VANE-WRIGHT R.I., 1990 - The Philippines - Key to the biogeography of Wallacea (pp. 19-34) - In: W.J. KNIGHT & HOLLOWAY J.D. (eds.), Insects and the Rain Forests of South East Asia (Wallacea). *Roy. entom. Soc. London*, London, iii + 343 pp.
- VOSS R.S. & EMMONS L.H., 1996 - Mammalian diversity in Neotropical lowland rainforests: a preliminary assessment - *Bull. Amer. Mus. Nat. Hist.*, New York, 230: 1-115.
- WERNER K. & WIESNER J., 1997 - Eine neue *Thopectica (Pseudotherates)* von Sulawesi (Coleoptera: Cicindelidae) - *Entom. Zeitschr. Insektenb.*, Essen, 107 (1): 41-43.
- WERNER K. & WIESNER J., 1999 - Ein weitere neue *Thopectica (Pseudotherates)* von Sulawesi (Coleoptera: Cicindelidae) - *Entom. Zeitschr. Insektenb.*, Essen, 109 (1): 17-19.
- WHITMORE T.C. (ed.), 1981 - Wallace's line and plate tectonics - Clarendon Press, Oxford, xii + 91 pp..
- WHITMORE T.C. (ed.), 1987 - Biogeographical Evolution of the Malay Archipelago - Clarendon Press, Oxford, x + 147 pp.
- WIESNER J., 1980 - Beiträge zur Kenntnis der philippinischen Cicindelidae (Coleoptera) - *Mitt. Münchn. entom. Ges.*, München, 70: 119-127.
- WIESNER J., 1992a - Eine neue *Thopectica* von den Philippinen (Coleoptera: Cicindelidae). 26. Beitrag zur Kenntnis der Cicindelidae - *Entom. Zeitschr. Insektenb.*,

Essen, 102: 128-130.

WIESNER J., 1992b - Verzeichnis der Sandlaufkäfer der Welt. Checklist of the Tiger Beetles of the World - Verlag Erna Bauer, Keltern, 364 pp.

SUMMARY

The genus *Thopeutica* Chaudoir (in Schaum, 1861) and its subgenera are defined. In its present sense, this genus includes elements from both the Philippines and Sulawesi, thus proving itself to be a "Wallacean" endemic. The taxonomy and all recorded biological data are provided for the 26 Philippine species (all of which are Philippine endemic). A detailed description, a general discussion and illustrations of pertinent characters of each species are provided.

Philippiniella new subgenus is erected for four Luzon species. Moreover, nine new specific taxa of subgenus *Thopeutica* are described (type locality in parantheses): *darlingtonia* n. sp. (Luzon: Bataan Prov.), *boettcheri* n. sp. (Luzon: Laguna Prov.), *luzona* n. sp. (Luzon: Quezon Prov.), *pseudoluzona* n. sp. (Luzon: Sierra Madre, Quezon), *negrosicola* n. sp. (Negros), *davaoensis* n. sp. (Mindanao: Davao Prov.), *zetteli* n. sp. (Catanduanes), *palawanensis* n. sp. (Palawan) and *perconspicua* n. sp. (Luzon: Imugan).

The taxonomic status of the following taxa has been changed: *Thopeutica* (*Thopeutica*) *interposita* (W. Horn), revised status; *Th.* (*Th.*) *pauper* (W. Horn), new status; *Th.* (*Philippiniella*) *suavissima* (Schaum), revised status; *Th.* (*Ph.*) *aenula* (W. Horn), new status; *Th.* (*Ph.*) *rugothoracica* (W. Horn), new status.

Lectotypes have been designated for the following species: *Thopeutica* (*Thopeutica*) *angulihumerosa* (W. Horn), *Th.* (*Th.*) *fugax* (Schaum), *Th.* (*Th.*) *pseudointerposita* (W. Horn), *Th.* (*Th.*) *interposita* (W. Horn), *Th.* (*Th.*) *conspicua* (Schaum), *Th.* (*Philippiniella*) *clara* (Schaum), *Th.* (*Ph.*) *suavissima* (Schaum), *Th.* (*Ph.*) *aenula* (W. Horn) and *Th.* (*Ph.*) *rugothoracica* (W. Horn).

The faunistics and biogeography of the Philippine *Thopeutica* and of their Sulawesi close relatives are also briefly discussed, and the outstanding richness and diversity of the Philippine tiger beetle fauna are duly emphasized.

RIASSUNTO

Vengono definiti il genere *Thopeutica* Chaudoir (in Schaum, 1861) e i suoi sottogeneri. Nel suo attuale significato, il genere include elementi sia delle Filippine che di Sulawesi (Celebes), dimostrandosi quindi endemico della "Wallacea". Viene precisata la tassonomia delle 26 specie (tutte endemiche) esistenti nelle Isole Filippine, fornendo per ciascuna di esse una descrizione dettagliata, una discussione generale, i dati distribuzionali conosciuti e l'illustrazione dei principali caratteri.

Un nuovo sottogenere, *Philippiniella* nov., è proposto per quattro specie dell'isola di Luzon. Vengono poi descritte nove nuove specie del sottogenere *Thopeutica*: *darlingtonia* n. sp. (Luzon: Bataan Prov.), *boettcheri* n. sp. (Luzon: Laguna Prov.), *luzona* n. sp. (Luzon: Quezon Prov.), *pseudoluzona* n. sp. (Luzon: Sierra Madre, Quezon), *negrosicola* n. sp. (Negros), *davaoensis* n. sp. (Mindanao: Davao Prov.), *zetteli* n. sp. (Catanduanes), *palawanensis* n. sp. (Palawan) e *perconspicua* n. sp. (Luzon: Imugan).

Viene inoltre modificato lo status tassonomico dei seguenti taxa: *Thopeutica* (*Thopeutica*) *interposita* (W. Horn), status specifico confermato; *Th.* (*Th.*) *pauper* (W. Horn), bona sp.; *Th.* (*Philippiniella*) *suavissima* (Schaum), status specifico confermato; *Th.* (*Ph.*) *aenula* (W. Horn), bona sp.; *Th.* (*Ph.*) *rugothoracica* (W. Horn), bona sp.

Vengono infine designati i lectotipi delle seguenti specie: *Thopeutica* (*Thopeutica*) *angulihumerosa* (W. Horn), *Th.* (*Th.*) *fugax* (Schaum), *Th.* (*Th.*) *pseudointerposita* (W. Horn), *Th.* (*Th.*) *interposita* (W. Horn), *Th.* (*Th.*) *conspicua* (Schaum), *Th.* (*Philippiniella*) *clara* (Schaum), *Th.* (*Ph.*) *suavissima* (Schaum), *Th.* (*Ph.*) *aenula* (W. Horn) e *Th.* (*Ph.*) *rugothoracica* (W. Horn).

Viene poi fatto rimarcare come il genere *Thopeutica* abbia originato due distinti sottogeneri in ciascuno dei due gruppi insulari da esso popolati, il sottogenere *Philippiniella* nov. nelle Filippine e il sottogenere *Pseudotherates* Cassola, 1991 a Sulawesi, quest'ultimo (19 specie finora conosciute) caratterizzato da un'accentuata facies "theratoide" che realizza un'impressionante somiglianza (forse anche comportamentale) con le specie, semiarboree, del ben diverso genere *Therates* Latreille, 1817 (le 4 specie del sottogenere *Philippiniella* nov., invece, differiscono solo per l'inusuale forma del corpo e per il caratteristico disegno elitrale). Tutte le altre specie di *Thopeutica*, sia di Sulawesi che delle Filippine, vengono considerate appartenere al sottogenere *Thopeutica* s.str., ma mentre la maggior parte di quelle di Sulawesi sono di media o grande statura, con femmine generalmente sprovviste di solchi di accoppiamento ("coupling sulci"), la maggior parte delle specie delle Filippine (e inoltre anche 4 specie di Sulawesi) sono di piccola o media statura e inoltre le loro femmine possiedono distinti solchi di accoppiamento.

Ad un'analisi faunistica e biogeografica, la fauna dei Cicindelidi delle Filippine si dimostra, nel suo complesso, particolarmente ricca e diversificata, con ben 111 specie (oltre l'85%) endemiche dell'Arcipelago; e anzi, ove si escludano le isole di Palawan e Balabac (politicamente appartenenti alle Filippine ma geograficamente situate sulla placca borneana), questa percentuale si accresce ancor più. Nel complesso le Filippine, nonostante la loro ridotta superficie territoriale, risultano essere il quinto paese del mondo per numero assoluto di specie di Cicindelidi e il quarto quanto al numero di specie endemiche.

A livello di generi, mentre tutti gli altri generi rappresentati nelle Filippine presentano una più o meno ampia distribuzione Orientale (generi *Tricondyla*, *Therates*, *Dilatotarsa*, *Heptodonta*, *Lophyra* sottogenere *Spilodia*), il genere *Thopeutica* è l'unico a mostrare una distribuzione ristretta, limitata alle Filippine e a Sulawesi, risultando quindi endemico della "Wallacea", e, come suggerito già in un precedente lavoro (CASSOLA, 1991), è probabilmente derivato, assieme al simile genere *Wallacedela* Cassola, 1991 (endemico di Sulawesi), da un più antico stock faunistico, forse tropico-gondwaniano, dando luogo ad un vigoroso processo di speciazione irradiativa. La probabile doppia origine insulare di Sulawesi, ritenuta dalle più recenti vedute paleogeografiche, potrebbe in qualche modo spiegare il contestuale popolamento di questi due problematici gruppi, di cui *Thopeutica* si sarebbe probabilmente evoluto nel frammento insulare occidentale (da qui la sua presenza, via probabilmente le isole Sangihe e Talaud, anche nelle Filippine), e *Wallacedela* si sarebbe invece evoluto in quella orientale, restando così endemico di Sulawesi, mentre la loro spiccata somiglianza di "facies" potrebbe essere dovuta alla competizione conseguente al contatto realizzatosi dopo la collisione delle due placche.